Contributions to Western Botany

No. 18

Marcus E. Jones, A. M.

Claremont, California

Issued Aug. 1933 - April 1935

BIOGRAPHICAL SKETCH OF PROF. JONES
BY MABEL JONES BROADDUS
STOCKTON, CALIF.

rec'd.
4 Aug. 1935
EX LIBRIS
JOSEPH EWAN

Advance sheet from Contr. 18 of M.E. Jones.
Comm. Susan W. Hutchinson.

factors in plant development he would have got the same results in half the time. It is a well-known fact that plants growing in alkaline soil develop thick and fleshy leaves and reduced flowers, and those growing in acid soil develop thin and broad leaves and large flowers. Many other equally important factors were known to plant breeders and are used by them in producing new plants, but, with it all, we are continually confronted with the factor of sporting along senseless lines, in our attempt to explain natural processes rationally. The mentally lazy theologian will clasp his pious hands and ejaculate "What God hath wrought is past finding out", but the scientist demands to know. Those who claim the creative mind behind evolution point to the exceptional and not the common things as showing super-human intelligence, such as the development of the ear and the nervous system, and the blood circulation in animals. If they would consider the common exhibitions of intelligence in animals, such as the absence of group protection in whales (so conspicuously present in monkeys and peccaries), the wonderful wasp intelligence in paralyzing food and making nests for their larvæ, and neglecting simple precaution against fly-blowing their prey, showing that everywhere in Nature stupidity prevails in the propagation and preservation of living forms.

I confess to a confusion of mind in trying to recognize anything new in Osborn's "Six Principles of the New Concept"

The only new thing is the statemet. His use of borrowed Greek may seem learned, but to me it is camouflage.

I agree with Noyes and Margenau that photosynthesis as an uncertainty principle is an empty one, for it is subject to rigid chemical laws and is uncertain simply because of its complexity, just as the synthesis of the animal and vegetal hydrocarbons is uncertain because of their various responses to catalysts and temperatures. But the more care is taken to keep conditions normal, the more these complex forms are resolved.

There is no doubt in my own mind that by proper control of conditions much of the sporting of living forms can be controlled, and the development of new forms can be hastened and directed, but at last analysis we are up against some form of determinative evolution. In the event of a perfect understanding of all growing conditions we may find a quantitive law behind it all, but I seriously doubt that we can ever find a quantatitve explanation for life. Gray put it well when he said that evolution can account for the preservation but not for its origin.

That Nature is dough in the hands of Man is a well-known fact. How else can we account for the wonderful development of sugarcane, bananas, and seedless citrus fruits, all of which are incapable of self-propagation?

Some people forget some facts about animals. It is the gen-

EX LIBRIS
JOSEPH EWAN

eral belief among geologists that the great reptiles and mammals of the Tertiary and earlier ages became topheavy by over-development and have about faded out now, there being only a few waifs left, such as the elephants, rhinoceros, hippopotamus, tigers, lions and whales.

A conspicuous illustration of a biological misfit is the Cactaceæ, a family of horrid armament and wonderful floral development, specially adapted to possess the Earth but so handicapped by weak productive organs and inability to adjust itself to humid conditions that it cannot become a menace. The religionist will point this out as a special provision of an all-wise Creator, but the scientist will reply that if He were all-wise He would not have let such an emergency arise, but to him it is simply a case of a family carried away by a craze for floral and spine development to the detriment of self-propagation.

* I thought you might be interested in a Perhaps you had better not let anybody see it - because Mrs. J. has a bad disposition.

W. L. Jepson as a Botanical Editor.

In what the young folks of today would call the wild and woolly past it was axiomatic editorially to be truthful, fair and interesting: now the only requirement seems to be "make a story".

The result is that scientists shun reporters as they would snakes for the average reporter shows the intelligence of a twelve-year-old child. Jepson seems to regard this class as ideal.

I have several times called attention to his lapses and exhibitions of personal spites, such as his unjust criticism of Miss Eastwood (see my Cont 13 p. 74), his slap at Mrs. Brandegee in his mushy review of Greene, and his general unfairness toward brother botanists. But I never noticed exhibitions of actual viciousness till my attention was called (July 4th. 1932) to Madrona vol.1 p. 218 July 1929, in which he publishes a letter of Parry's written in 1882.

The facts in that case published in an April number of 1882 of the San Diego Union, and in my Cont. 17, are as follows: I accidentally met Parry at the hotel, and he told me that Pringle was there, and he suggested that we three form a party to explore Mexico, so I agreed. Parry and I hired a team and buggy of the widow Orcutt, and her son Charley as cook and driver. Charley soon became offensively insubordinate and had to be called to time.

On our return from Ensenada we reached Tiajuana Saturday night. I had never traveled nor collected on Sunday, and so did not want to go in the next day, but for reason of "urgent business" Parry could not wait, but promised if I would let him and Charley go in he would send Charley right back with the team. I did not discover, for some time, what Parry's hurry was about till the Botanical Gazette came out with my new rose with a new name by the "high minded" botanical thief Parry.

So they left Sunday morning, but Charley did not return till Wednesday, and had his older brother, a man about my own age, with him. Their conduct, on their arrival, indicated no good to me and so I refurbished an old pistol that I carried, and strapped it on me and went out and hitched up the team. At this juncture the brother sprang to the bits of the horses and told me I could not drive the team, I exhibited the pistol and told him to get, and he got in a hurry, for he would have been shot if he had not. Mexico was lawless then and is not much better now.

Below is Jepson's alleged account of the same incident, over his signature. There was nothing in Parry's letter about the incident but Jepson lugs in the following in a footnote, as follows:

"On this expedition there was collected large amount of new material which has become classical. The majordomo of the pa

* Susan W. Hutchinson scripsit

ty was H. C. Orcutt of San Diego, assisted by his son C. R. Orcutt. Here it is that the younger Orcutt acquired, under the influence of Dr. Parry, an interest in collecting plants and turned plant collector for life. Another member of the party was C. G. Pringle, a prince of plant-collectors, whose name was well-known to botanists everywhere".

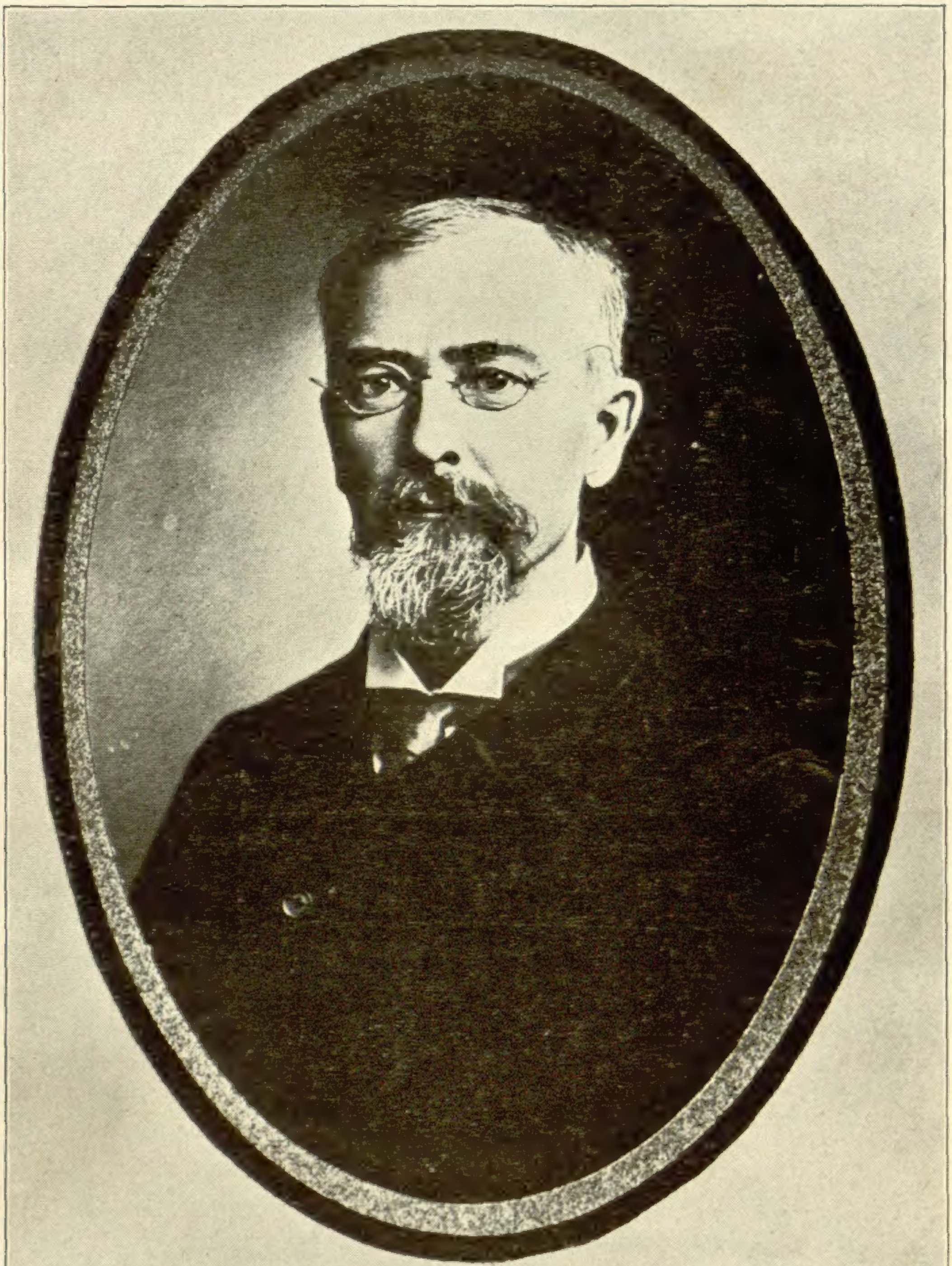
"The Orcutts were Sabbattarians and when it came the Lordsday they proposed, as a matter of course, that neither man nor beast should should travel. A fifth member of the party drew a gun and forccd the Orcutts to proceed. It i sunnecessary to say that neither the high-minded Parry nor the considerate and friendly Pringle had anything to do with this coercion". (Slobber)

Of course neither Parry nor Pringle had any part in it for Pringle was out on the desert and the "high-minded" Parry was in San Diego stealing my new rose (R. minutifolia).

Now the query is What was Jepson's motive in going back 47 years to resurrect an old letter so that he could knock a man not mentioned in the letter, and whom Jepson is too cowardly to name

Let me play Sherlock Holmes. It happened(?) that my extended criticism of Jepson's flora was published a month before this effusion of Jepson's exuded. In that criticism I cited many glaring errors and could have cited many more. It would not have been at all out of my way to have laid bare his reputation among us for he has alienated most of his clientele by his selfishness. I have felt, however, that since he has announced an intention to write a flora of California he is entitled to the field, and have criticised as piracy Abrams' attempt to enter the same field, but when Jepson resorts to bald-faced lying and distortion of facts to make a case one's patience with him becomes strained.

Orcutt's father was dead therefore was not a member nør the majordomo of the party. Pringle at that time was not known for he had not botanized in Mexico. The Orcutts were not Sabbatarians and had no scruples about Sunday travel. When the Orcutts tried to force me I used my gun rather than use my fists in a losing battle against the two men.



MARCUS E. JONES, AT SIXTY

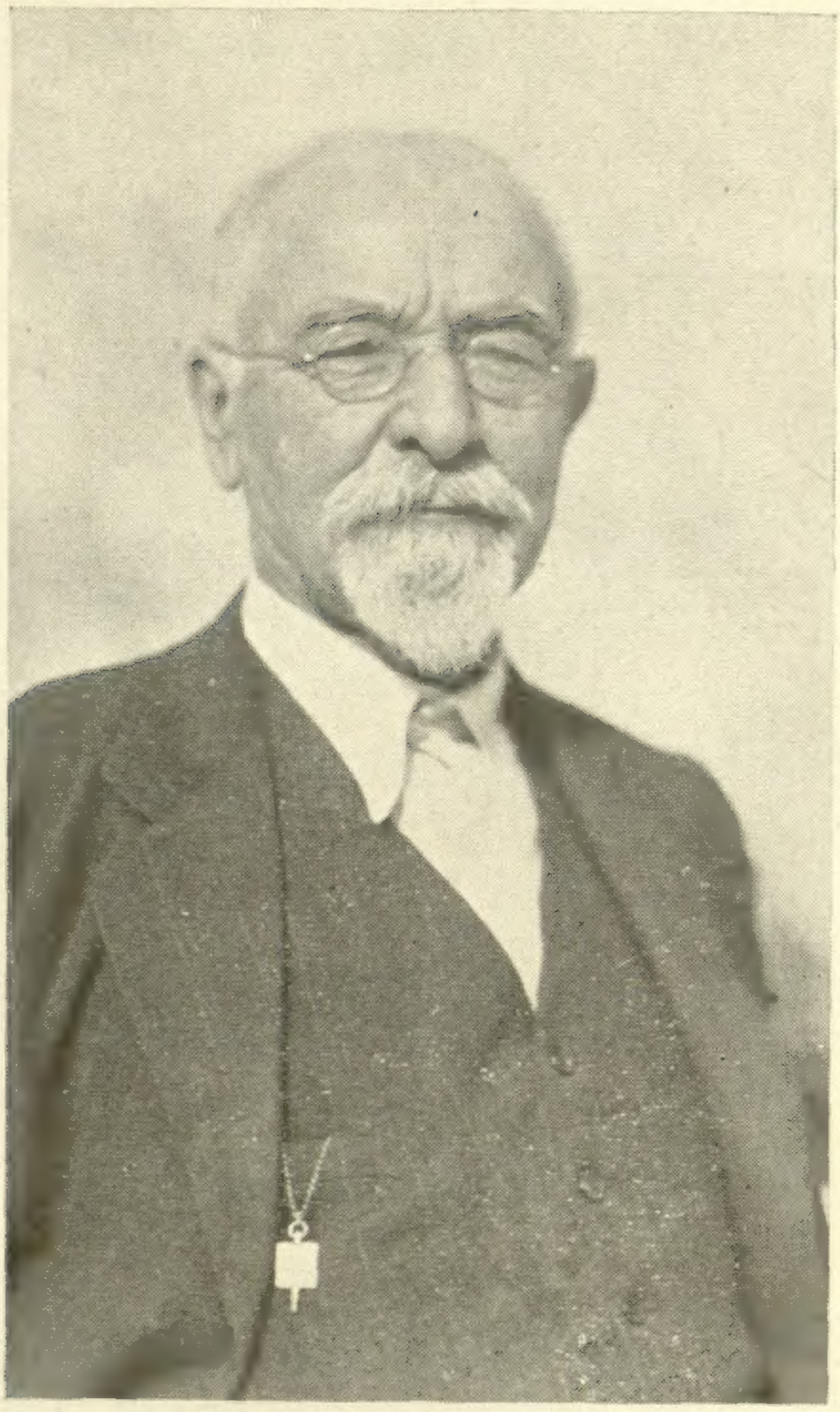


Photo by Ledyard, 1931

MARCUS E. JONES

MARCUS E. JONES ON SUMMIT OF McDOUGAL PEAK, MONT., WITH MISS GREEN AND MRS. JOSEPH CLEMENS

Botanists Whom I have Known.

With this issue I present the portraits of the botanists I have known, those worthy of consideration from my standpoint, and of others whose work has made them notorious.

I have also contended it is a botanical crime to use photos of men taken after they had ceased to be effective (in old age). No one cares to be presented in that condition, but necessity sometimes requires it when no other photo is available.

The three men and one woman, who stand out most prominently in Californian botany, have left no really good photos of themselves. There is but one indifferent photo of Brandegee and his wife, presented here. There is a fair one of Parish, also presented here. There is but one photo of myself that I would ever care to represent me, but my friends prefer the older one, both given here. Several others have been printed in various papers and magazines, but none of them were satisfactory to me. As a concession to my friends, I give the latter also.

There are good photos of Gray and Watson available, but I have found none of Nuttall, Pursh, Michaux, Kellogg, Rose, Coulter, or Bessey. I did not know Nuttall or the earlier botanists. Kellogg was the third, mentioned above.

Determinative Evolution.

In a recent issue of Science, vol. 74 p. 559, Osborn of the N. Y. Nat. Hist. Museum, broaches this subject a kind of discovery of the laws in the case. W. A. Noyes and W. A. Margenau, same vol. pp. 595-6 take exception to Compton's suggestion along the same line ("The Uncertainty Principle") in chemistry. Osborn says that there has been creative ("determinative") evolution in animals and heralds it as new in science. In 1923, in my revision of Astragalus, I brought out the fact that evolution is due to stress of ecological conditions in forcing plants to develop along lines favorable to the perpetuity of each species. In "Fundamentalism", published soon after that, I brought out the fact of determinative evolution by finite agencies (not human). The term creative evolution (Osborn) is a very vague one, which assumes the existence of an external power directing plant development. This whole subject is not at all new, in fact, older than Christianity. It has been held for ages that God created all things. But the great question now is "What kind of a god was it ?" The student of plant breeding finds that plants, under stress of certain conditions "sport" in all directions, like a blind man feeling his way, and not only in lines tending toward the perpetuation of the species, as should occur if under the direction of the Christians' omnipotent and omniscient God. We would expect that He would not produce a thousand seeds in order to get one to grow, and that He would get rid of abortive organs when they have ceased to function, and that we would not have the tremendous biological scandal of the desert turtle living one hundred thousand years with his useless shell on his back and where there is no water.

Evolution in Nature, as we find it in operation, shows about the intelligence of a ten year-old child. That there is mind is self-evident to me, but not the omniscient mind of my childhood days. The smart Aleck religionists will criticise me for daring to find fault with the Creator. A Creator with horse sense would not object to honest criticism, none others need be feared. That stupidity reigns everywhere in Nature is a self-evident fact to a man with his eyes open.

Burbank would plant ten acres of some special kind of plant and at maturity, out of the hundreds of thousands of individuals he would select those having the characters he was breeding for, a very few individuals, and he was supposed to be a great plant raiser because in twenty years he got such wonderful results. But Burbank was not much of a scientist, for had he used the known factors in plant development he would have got the same results in half the time. ~~It is a well known fact that plants~~ growing under

~~factors in plant development he would have got the same results in half the time~~. It is a well-known fact that plants growing in alkaline soil develop thick and fleshy leaves and reduced flowers, and those growing in acid soil develop thin and broad leaves and large flowers. Many other equally important factors were known to plant breeders and are used by them in producing new plants, but, with it all, we are continually confronted with the factor of sporting along senseless lines, in our attempt to explain natural processes rationally. The mentally lazy theologian will clasp his pious hands and ejaculate "What God hath wrought is past finding out", but the scientist demands to know. Those who claim the creative mind behind evolution point to the exceptional and not the common things as showing super-human intelligence, such as the development of the ear and the nervous system, and the blood circulation in animals. If they should consider the common exhibitions of intelligence in animals, such as the absence of group protection in whales (so conspicuously present in monkeys and peccaries), the wonderful wasp intelligence in paralyzing food and making nests for their larvæ, and neglecting simple precaution against fly-blowing their prey, showing that everywhere in Nature stupidity prevails in the propagation and preservation of living forms.

I confess to a confusion of mind in trying to recognize anything new in Osborn's "Six Principles of the New Concept" The only new thing is the statement. His use of borrowed Greek may seem learned, but to me it is camouflage.

I agree with Noyes and Margenau that photosynthesis as an uncertainty principle is an empty one, for it is subject to rigid chemical laws and is uncertain simply because of its complexity, just as the synthesis of the animal and vegetal hydrocarbons is uncertain because of their various responses to catalysts and temperatures. But the more care is taken to keep conditions normal, the more these complex forms are resolved.

There is no doubt in my own mind that by proper control of conditions much of the sporting of living forms can be controlled, and the development of new forms can be hastened and directed, but at last analysis we are up against some form of determinative evolution. In the event of a perfect understanding of all growing conditions we may find a quantitive law behind it all, but I seriously doubt that we can ever find a quantative explanation for life. Gray put it well when he said that evolution can account for the preservation but not for its origin.

That Nature is dough in the hands of Man is a well-known fact. How else can we account for the wonderful development of sugarcane, bananas, and seedless citrus fruits, all of which are incapable of self-propagation?

Some people forget some facts about animals. It is the gen-

eral belief among geologists that the great reptiles and mammals of the Tertiary and earlier ages became topheavy by over-development and have about faded out now, there being only a few waifs left, such as the elephants, rhinoceros, hippopotamus, tigers, lions and whales.

A conspicuous illustration of a biological misfit is the Cactaceæ, a family of horrid armament and wonderful floral development, specially adapted to possess the Earth but so handicapped by weak productive organs and inability to adjust itself to humid conditions that it cannot become a menace. The religionist will point this out as a special provision of an all-wise Creator, but the scientist will reply that if He were all-wise He would not have let such an emergency arise, but to him it is simply a case of a family carried away by a craze for floral and spine development to the detriment of self-propagation.

H. M. Hall.

H. M. Hall. The recent death of this promising young botanist is greatly deplored. It was his misfortune to be employed by Clements in his early botanical work, in which he seemed constrained to adopt some of that erratic botanist's foolish terminology. Clement's familiarity with his mother tongue was so poor, and his seeming knowledge of Greek so great that young men were hoodooed into falling into line with him, adopting his terminology as the most up-to-date thing in research, when in fact it was nothing but a grandstand bluff. When an American has to go back a thousand years to properly express his ideas we suspect ~~to find~~ a screw loose in his anatomy.

Hall's work on the San Jacinto mts. is a painstaking piece of work, and had he gone into it under proper direction he could unravel the tangle made by Merriam. His ideas on specific limitation were nearly right, but he set the example for a mass of foolish splitting in the species by giving names to varieties and forms as subspecies and subgenera, which others have followed supposing it was a new discovery instead of a piece of pure bunk.

His revisions of Bigelovia and Aplopappus (under othor names) were good. It was amusing to see him try to resurrect Haplopappus. Doubtless he was led into it by his "linguistic" superior, but had either of them been at all familiar with Greek they would have known that there is no letter "h" in Greek, for it was not considered worthy of litteral rank, just being a rough breathing, used or discarded according to the whim of the user, just as the English of today aspirate or de-aspirate initial vowels, much to our amusement. For example, they would spell saloon with a "hess", a "hay", a "hell", two "hoes", and a "hen".

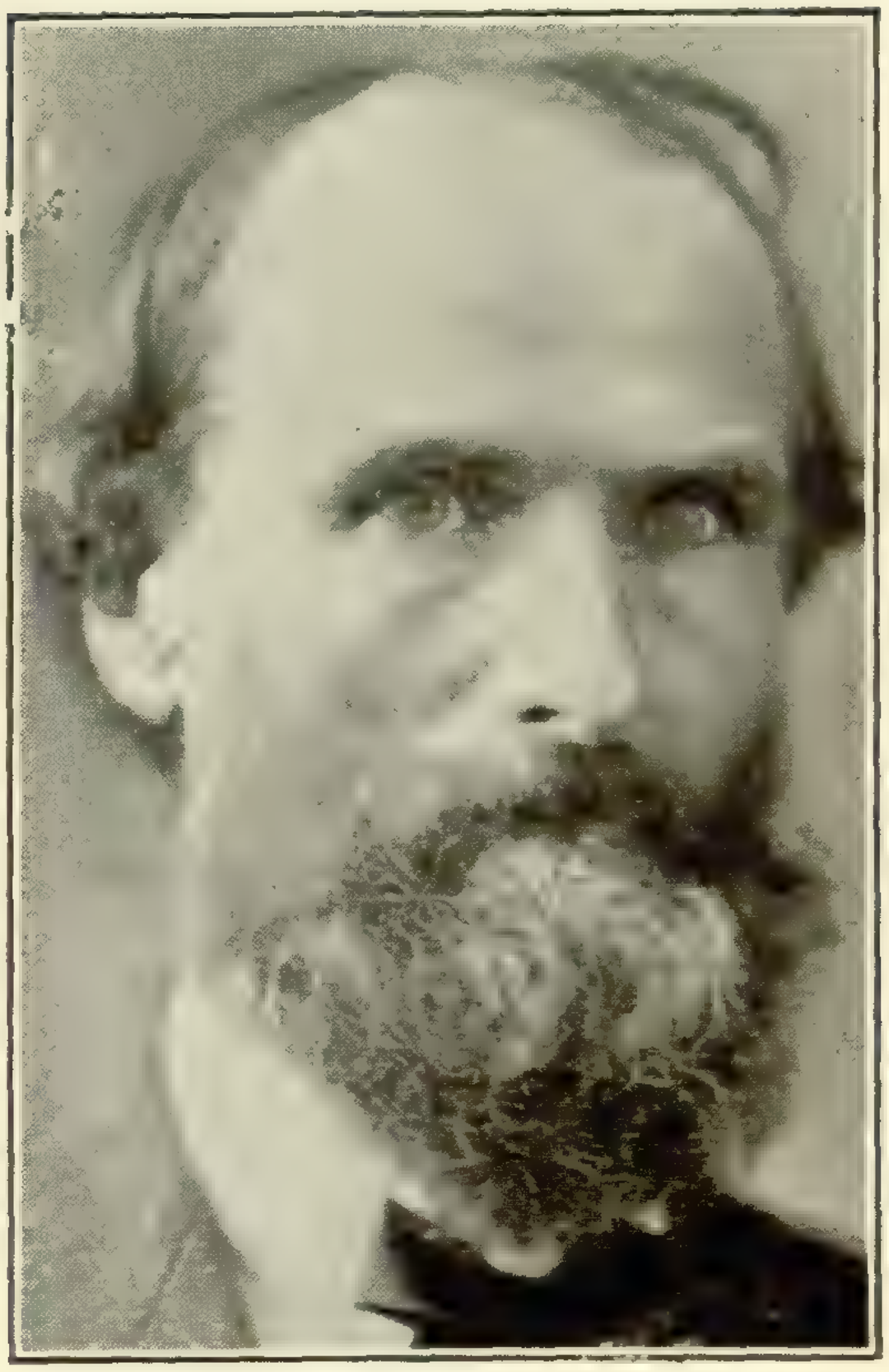
The founder of the genus, Cassini, chose to write it Aplopappus, and it remained so till Endlicher, the hair-splitter, tried to correct it, but the botanical world has ignored him.

Judge Ben Johnson.

The greatest penalty I know, for getting old, is to live to see those we love pass out into the great Unknown. Ben, ~~was~~ one of the younger sons of J. E. Johnson, of St. George Utah, whose name will always be remembered in early botanizing in Utah, has gone. Ben was his father's companion when he scoured the hills for the beautiful and new species of plants that made his father famous. Though born in polygamy Ben early abandoned Mormonism, married and moved to Salt Lake City, where he practiced law as his profession till death. He became judge of the municipal court, and later on clerk in the state library, compiling the laws.

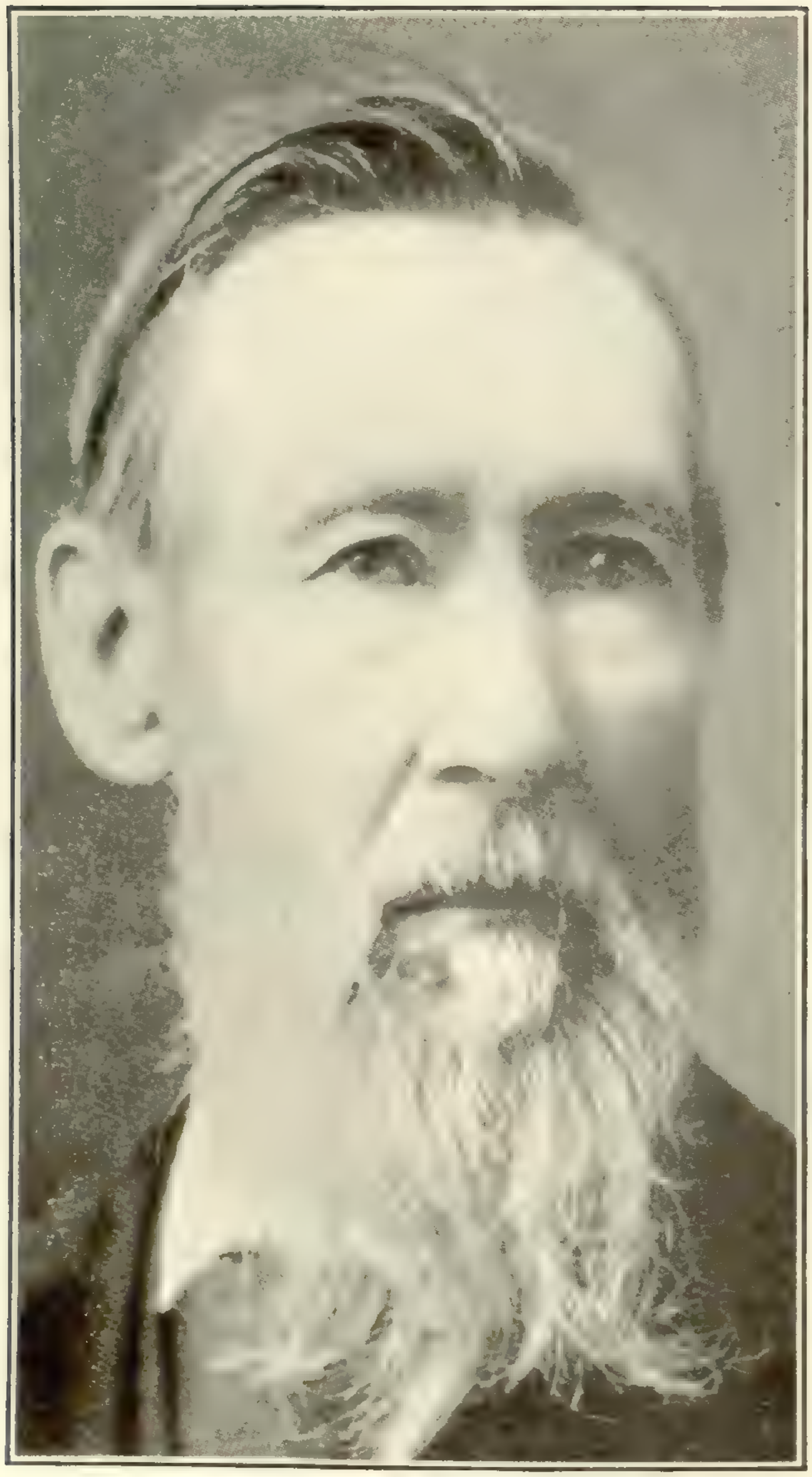
When in middle life he contracted tuberculosis, and for years hung between life and death, finally winning out, but the struggle left his lungs so weak that a bad spell of weather took him off. Only three days before he was stricken I had a fine visit with him and his wife, and I warned him against exposure, but he laughed it off. All his spare time was spent in his garden, raising rare plants or settling problems on obscure ones. He always had a fund of new things to discuss every time I visited my old home, and the visit was not complete till we had met. Ben was in constant correspondence with Burbank and other big growers, even in Europe. He also grew the best gladiolus, iris, tulips, lilies, and other show plants for the trade. He was a very successful grower of plants, and his whole soul was absorbed in the work. When I bade him a last goodby he seemed as well or better than ever, and liable to outlive me many years. There is no-one left to continue his work and his loss is irreparable.

JUDGE BEN. JOHNSON

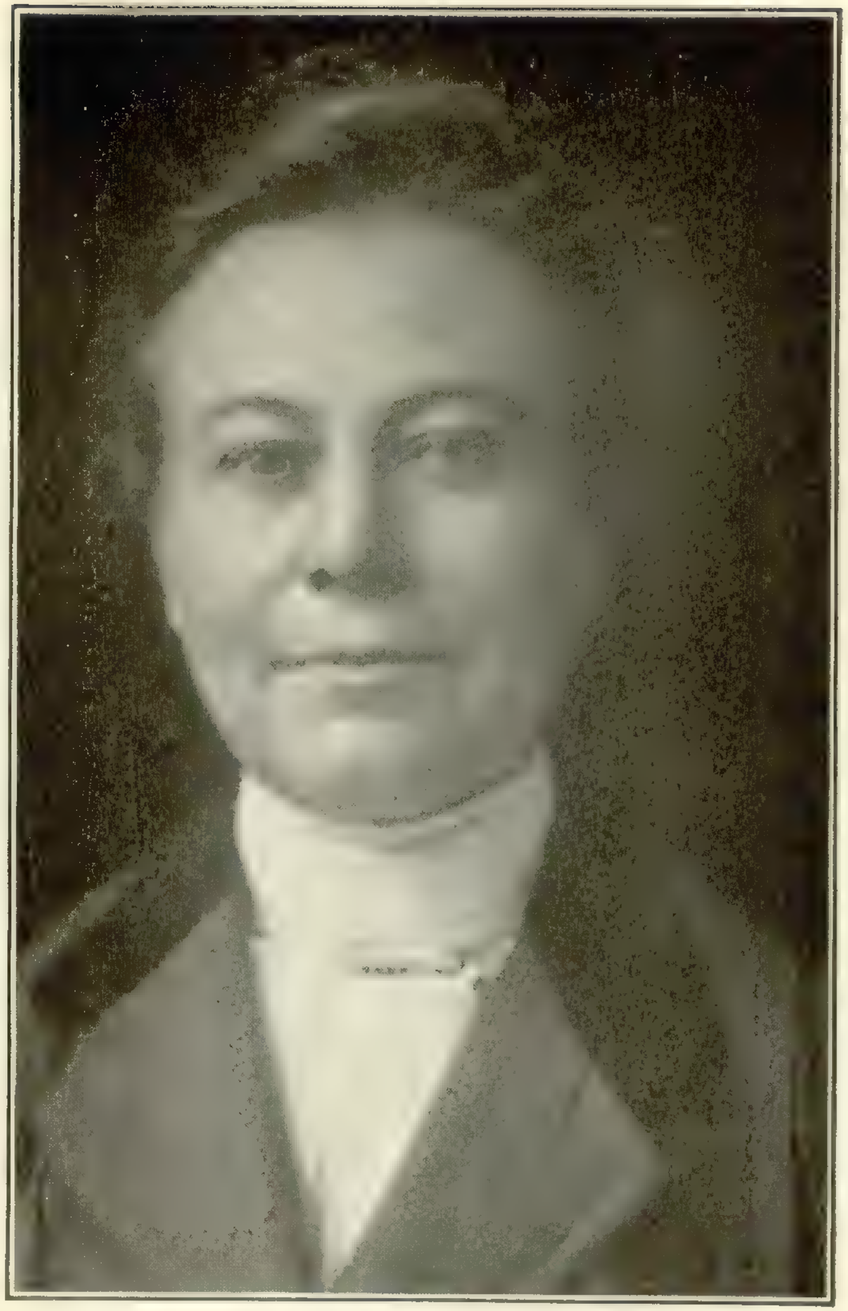


J. E. JOHNSON

C. F. BAKER



DR. GEORGE VASEY



ALICE EASTWOOD

ERYTHEA LORETENSIS N. SP.

C. F. Baker.

Baker undoubtedly was the most indefatigable and the most prolific botanist in America. He cannot be said to have been in any sense a model botanist for he burnt life's candle at both ends and thereby killed himself when he should have been in his prime.

He had no sense of obligation to his body, but rode it to death, often working all night, as well as day, to deliver some promised consignment. Once he and his wife labeled and put up 6000 insects in one night, for he was also an entomologist.

I never met him but he began sending me things to name, and then stopped. I never knew why till I began to see new species published by Greene from the same collection. Recently, in Berkeley in talking to his former associates, I found that he admitted that the sale of his sets depended on the number of novelties in them. So he had them determined by the man who could see the most novelties in them, and Greene stood at the top, for he could see them where they did not exist. To me that kind of work is infamous.

Baker was what I would call a good botanical collector, but a sloppy scientist, for his work was not done scientifically. He made no effort to know each species as it grew, all its varying forms. So they have little value ecologically. Botanizing should be an honest attempt to know the flora as it is, and not a wild scramble to make a few extra dollars selling alleged novelties.

Alice Eastwood.

I present here the portrait of Miss Eastwood, (following my announced plan of using photos of such in their prime,) who is first in being the most indefatigable woman in America. There are few botanists who know of the herculean task she set for herself, and simply for the love of it, the remaking of the herbarium of the California Academy of Science, which was destroyed by the earthquake. That herbarium ranked first in the West as the depository of the types of Californian plants.

I do not take much stock in hunches. they are often hallucinations, but Miss Eastwood had a hunch that she should collect all the types in the herbarium, and it soon became an obsession, and she obeyed it. When the great quake came it did not destroy the building but did break the water mains and so made the great fire possible ~~and~~ which soon reduced everything to ashes. Immediately after the quake she hurried to the Academy and carried off the precious types. Since then she has given her life to rebuild the herbarium, working early and late, going everywhere, suffering any inconvenience and loss of time and money, just so the herbarium benefited. When I inspected the new library and rows of new cases filled with botanical specimens I took off my hat in reverence. Her work, like mine, is mostly done, and the falling leaves will soon obscure our graves, but it will be many a day before botanists will cease to venerate her magnificent work for the Academy. I have known her for a generation, and we have worked over the same field, but I have found her too big for jealosies and petty squabbles, which have disgraced a certain envious critic.

She is always helpful and generous, to a fault. The other day she accused me of saying she " is honest and a lady always" (see Cont. 13 p. 74). I plead guilty, and could say more.

W. L. Jepson as a Botanical Editor.

In what the young folks of today would call the wild and woolly past it was axiomatic editorially to be truthful, fair and interesting: now the only requirement seems to be "make a story".

The result is that scientists shun reporters as they would snakes for the average reporter shows the intelligence of a twelve-year-old child. Jepson seems to regard this class as ideal.

I have several times called attention to his lapses and exhibitions of personal spites, such as his unjust criticism of Miss Eastwood (see my Cont 13 p. 74), his slap at Mrs. Brandegee in his mushy review of Greene, and his general unfairness toward brother botanists. But I never noticed exhibitions of actual viciousness till my attention was called (July 4th. 1932) to Madrona vol.1 p. 218 July 1929, in which he publishes a letter of Parry's written in 1882.

The facts in that case published in an April number of 1882 of the San Diego Union, and in my Cont. 17, are as follows: I accidentally met Parry at the hotel, and he told me that Pringle was there, and he suggested that we three form a party to explore Mexico, so I agreed. Parry and I hired a team and buggy of the widow Orcutt, and her son Charley as cook and driver. Charley soon became offensively insubordinate and had to be called to time.

On our return from Ensenada we reached Tiajuana Saturday night. I had never traveled nor collected on Sunday, and so did not want to go in the next day, but for reason of "urgent business" Parry could not wait, but promised if I would let him and Charley go in he would send Charley right back with the team. I did not discover, for some time, what Parry's hurry was about till the Botanical Gazette came out with my new rose with a new name by the "high minded" botanical thief Parry.

So they left Sunday morning, but Charley did not return till Wednesday, and had his older brother, a man about my own age, with him. Their conduct, on their arrival, indicated no good to me and so I refurbished an old pistol that I carried, and strapped it on me and went out and hitched up the team. At this juncture the brother sprang to the bits of the horses and told me I could not drive the team, I exhibited the pistol and told him to get, and he got in a hurry, for he would have been shot if he had not. Mexico was lawless then and is not much better now.

Below is Jepson's alleged account of the same incident, over his signature. There was nothing in Parry's letter about the incident but Jepson lugs in the following in a footnote, as follows:

"On this expedition there was collected large amount of new material which has become classical. The majordomo of the par

ty was H. C. Orcutt of San Diego, assisted by his son C. R. Orcutt. Here it is that the younger Orcutt acquired, under the influence of Dr. Parry, an interest in collecting plants and turned plant collector for life. Another member of the party was C. G. Pringle, a prince of plant-collectors, whose name was well-known to botanists everywhere".

"The Orcutts were Sabbattarians and when it came the Lordsday they proposed, as a matter of course, that neither man nor beast should should travel. A fifth member of the party drew a gun and forced the Orcutts to proceed. It i sunnecessary to say that neither the high-minded Parry nor the considerate and friendly Pringle had anything to do with this coercion". (Slobber)

Of course neither Parry nor Pringle had any part in it for Pringle was out on the desert and the "high-minded" Parry was in San Diego stealing my new rose (R. minutifolia).

Now the query is What was Jepson's motive in going back 47 years to resurrect an old letter so that he could knock a man not mentioned in the letter, and whom Jepson is too cowardly to name

Let me play Sherlock Holmes. It happened(?) that my extended criticism of Jepson's flora was published a month before this effusion of Jepson's exuded. In that criticism I cited many glaring errors and could have cited many more. It would not have been at all out of my way to have laid bare his reputation among us for he has alienated most of his clientele by his selfishness. I have felt, however, that since he has announced an intention to write a flora of California he is entitled to the field, and have criticised as piracy Abrams' attempt to enter the same field, but when Jepson resorts to bald-faced lying and distortion of facts to make a case one's patience with him becomes strained.

Orcutt's father was dead therefore was not a member nor the majordomo of the party. Pringle at that time was not known for he had not botanized in Mexico. The Orcutts were not Sabbatarians and had no scruples about Sunday travel. When the Orcutts tried to force me I used my gun rather than use my fists in a losing battle against the two men.

Douglas and Annual Rings.

During the summer of 1931 Douglas, of the Carnegie Inst. at Tucson, was reported in the newspapers as saying that the annual rings of trees and shrubs are true indices of the years elapsed while they were being formed, and on this basis he made an elaborate summary of the time since certain cliff dwellings were built.

If Mr. Douglas is a botanist of even ordinary education and experience in the southwest he knows that the statement is a falsehood. I have no sympathy with the idea that the public likes to be humbugged and deceived, particularly in scientific matters, so commonly done today in California in one of our prominent colleges

Scientific men look with some allowance on talks to general audiences where there is manifest stuffing of the facts, though even this is pernicious, but this kind of whooping it up for the Carnegie Institute by MacDougal in the guise of Douglas should have a crimp put in it. It is not generally known that MacDougal is a pastmastor in the use of hot air, wind, and star chamber proceedings, a fact that I discovered when I was Secretary of the Utah meeting of the A. A. S.

North of lat. 42° annual rings are fairly indicative of the age of trees if properly interpreted, but south of that in California, Arizona, New Mexico, and western Texas they are almost worthless unless corrected by independent data. The reason for this is that region has a Tropical climate, has no real winter, Tucson being near the border line. This area has little or no frost, but in its place a wet and a so-called dry season, where the lowest growing temperature (about 43°) is seldom reached, and for this reason vegetation will start whenever there is enough moisture. In the area in question there is a great mixup so that there is often enough rainfall in the spring to bring the trees into leaf, to my own knowledge this has been the case for the past nine years, and therefore to make an "annual" ring. Then when everything dries up in the hot months and takes a rest till the rainy season begins, vegetation makes a new start and a new ring on the trees.

For this reason there are two rings a year, and it is a misnomer to call them annual rings. There is another complication. There have been two years in the last nine when over a part of the area there was no rain in the fall, and so no ring was formed. The desert is notorious for its spotty rainfall.

Now knowing these facts what is the sense in going before a gaping world and chattering in terms of years about the age of the cliff-dwellers ?.

Mrs. T. S. Brandegee.

In these sketches of botanists whom I have known it must not be assumed that I am attempting biographies, my aim is to mirror to you the person as he appeared to me, and in an unvarnished light, for I abhor slobber, and the petty lying that passes under the cloak of diplomacy (see Jepson's reviews of the work of Greene and others).

Mrs. Brandegee was Kate (Katherine) Layne, the oldest in a family of five children. Susan was next, like Kate, a husky and red-blooded woman of tireless energy, who married Mr. Stockton and bore him nine children, and lived and died at Ramona where her son still lives. Sophronia was next who died young. Then Alfred the cripple was next and he also died early. The last was Tom, who left home early and all record of him is lost.

It is recorded that the Laynes were of the Bolling stock, as was Brandegee himself. It seems to be a law of nature that brainy people come from brainy stock.

The first record of the family is of their being in Salt Lake City in the great gold rush to California, in the forties. Mrs. Layne was a talented weaver, and her husband an irascible schoolteacher. They were short of funds, and so the wife got work at weaving and was so proficient that Brigham Young tried to have them remain and become Mormons. They did stay a year, and then moved on to Carson City Nevada, where Kate was born.

To some people to grow up in the electric atmosphere of the greatest mining camp in the world would stimulate even sluggish minds to do their best, but persons like the Layne girls would be set on fire. I myself was there when the great Comstock, only a few miles away was booming (in the eighties) and you could not miss the thrill of those glorious days. No doubt to be born and raised in such environment had much to do with Kate's mental growth. Those were the beginning of the caliper age, the age of precision, when things had to measure up to standard, in distinc- from the happy-go-lucky days before.

It is evident that the home life was not pleasant, because of the father's violent temper, and because of the early death of the mother. The two older girls were so self-contained that they often fought in hair-pulling scraps, and yet to the end they dearly loved eachother and corresponded to the end of life.

The two girls were almost opposites. Susan was very affec-

MR. AND MRS. T. S. BRANDEGEE

DR. GEORGE ENGELMANN

tionate, a home lover, a good housekeeper, an observer of the conventions, a good mother, and a devout Christian. Kate was at all times au uncompromising rebel. Her sister sometimes chided her for the way she kept house and for her dress, but she would tolerate no other way. To demand that she should conform to any custom meant war to her. She interfered with no ones affair and demanded the same freedom for herself. She was always self-contained and asked no favors. She was more masculine in her attitude toward the world than any woman I ever knew, and less offensively so. I know several old maids who have fried, and boiled, and roasted man every time they open their mouths, cant feel right till they have knocked the men, doubtless because the men have offended their vanity by ignoring them.

So far as my relations with her were concerned Mrs. Brandegee never attempted to dominate me in anything, and if she had she might have receivod the same answer that one of our local women got who attempted it. I let her talk till she got out of breath (generally two and a half minutes) and when she was drawing for the next wheeze I turned to her sharply and said "When a woman tries to razz me I tell her to go to Hell". She shut up so tight that it took her an hour to get her mouth open and she has been very docile ever since. No one is more kindly to women than I so long as thcy keep their places.

It is uncertain whether the family remained in Nevada long enough for the children to become of school age, for they moved to the west of the Sierras, and there Kate became a school teacher and during this time she fell in love with an Irish-Catholic by the name of Curran, she herself never was religious. They lived together for a time, but he became, or was, a drunkard and she had to go back to teaching or starve. This ended in a separation, but Kate never lost her affection for him, but doctored him up when sick, and buried him when dead, and in spite of her poverty she paid all of his bills, most of which were for drink. She seemed to consider him an unfortunate. I noticed the same attitude in her reaction toward her second husband in certain things that would make most women furious. This tolerant attitude toward us as though we were half savages is quite agreeable to some men, but we do not require any such treatment, for self-control is the glory of men. I am convinced that the savage reaction toward me when I said to her "You owe it to the world to let us have the story of your life", and she savagely turned to me and bitterly replied "What does the world care for mc ?", was thc cry of a wounded heart, of one longing for recognition long over-due.

To me such an attitude is childish, the Bible puts it well in saying " If thou faint in time of adversity thy strength is small."

We all have periods of feeling unappreciated. How can it be otherwise ? We bury ourselves in our shells and expect others to dig us out, but they are too busy with their own struggles. The only reward worth having is the consciousness that we have been honest with the truth and done our work well. Then we are exempt from the devilish, cowardly. pussyfooting element always whispering in our ears the sordid things of self-interest, that poison all good. It is no discredit that Kate's soul cried out in anguish at the world's indifference. We are all human.

It appears that with all her struggle against poverty and a drone of a husband Kate took a complete medical course, doubtless to the better her care for her "unfortunate" husband. She never discovered her wonderful mental equipment that made this possible but just went ahead and did things in spite of all handicaps. One of the things that impressed me most was her perfect memory of contemporary botanical literature, for she was familiar with the writings of all our botanists from the earliest times till now, a herculean task in itself. It is probable that she began her botanical studies under Greene in the late eighties and because of her talent became his assistant. She was indefatigable both in the field and herbarium, and early began pnblishing valuable things such as identifications of Kellogg's new species which relegated some of Gray's names to synonymy, a daring thing in those days. There were many problems of distribution to settle requiring much traveling and research, till she became a walking encyclopedia on California botany.

It will be well to recall that Greene was an Episcopalian minister at Silver City New Mexico when his name was prominent in Gray's publications on western botany, along with many others, such as Lemmon, Howell, Cusick, and myself. He moved to Berkeley as pastor there. Before long his social vices caused his unfrocking. He then became a rabid Catholic. It was at this time that he was elected professor of botany at the state University. Mrs. Curran was Greene's assistant for some years, and during that time Greene proposed naming an Astragalus for her as A. Curranae, but iu a letter she objected, saying she was born a Layne, Curran, an acquired name which she might not retain, but she, later on, did not object to Anemia Brandegeae by Davenport.

After a time we find her the curator of the herbarium of the California Academy of Science,following the death of Dr, Kellogg.

That this was caused by a flareup with Greene was evident for when I first met Greene at Berkeley he referred to her as a "she devil", the women were always his nemeses, and she soon after got his dismissal. As a rule when woman have difficulties with men hey are vicious, but she never made any comment on Greene when

with me. She knew that I had called his Eschscholtzia work "botanical drivel".

Since she was irreligious, one would expect to hear her rant against, as most scoffers do, but, though she held nothing sacred, she was scrupulously honest even in her thinking. For example, Miss Eastwood began browsing in my field, the Navajo Basin, and collected several species that I had discovered years before and not described because of the incipient ruction with Gray, but now that Gray was dead, there was no occasion for delay and so I began, by request from Zoe, to publish new species. Among these was Verbesina scaposa. On reading my MS. Mrs. Brandegee thought my species was the same as Miss Eastwood's Encelia nutans, so to protect Miss E. she printed her article first, without consulting me. Many botanists would have been sore over it for I was the discoverer of the species, and the only right Miss E. had was priority in submission of MS. I had sense enough not to be angered by it and it never was mentioned. Most editors would have suppressed Miss Eastwood's species, but not she. Her course wss the only one and 1 doubt if Miss E. knew of it. Such sterling fairness is rare.

You would not expect much precision in a chronic female rebel, but Mrs. Brandegee was a model in thoroughness in her botanical work, and she put the herbarium on a sound basis both in the mounting and arrangement of specimens. She was the author of the wellnigh universal method of mounting specimens, which I would not tolerate if I controlled a herbarium. The gluing of specimens directly on the sheets, instead of by stickers is ruinous

It was opportune that Brandegee came to California at this time with a lot of Columbia Basin and north Pacific plants to name, for he was the oldest and most accomplished botanist in the country, and his presence would command respect and dispel the aura that Greene had cast about himself as a human god. Brandegee never squabbled. He was a very insignificant looking and little man who did not have to blow about himself (like Greene) to be heard. The atmosphere cleared at once, and everyone saw the beginning of a new era. Mrs. Curran fell "insanely in love" with Brandegee, as she put it in a letter to her sister It surely was a droll affair, a most intensely masculine woman desperately in love with the most retiring and effeminate man, and both of them dead in earnest about it, the man too with other women buzzing around like flies in fly-time.

It was at this time that Brandegee had a legacy of $40,000. So they married, and if there ever was a pair of marital chums they were it. She never dominated him for he would not tolerate such a thing. She was not a worshiper of any man. But she knew her place and kept it, a thing that few women do.

The stimulus of being united to a man with the commanding intelleet of Brandegee was just the necessary tonic his wife needed and she began systematic research to settle the status of all the Calfornian plants. No one seems to know her motive behind it all whether it was just the satisfaction of settling problems, like her husband, but we all hoped she would publish a flora of California.

Neither she nor er husband were ecological botanists, nor have I found any other systematic Californian botanist who knows anything worth mentioning on the subject, they just tag along behind Merriam like a flock following a bell-wether. Hall was the only one to attempt to be original, and he confused drainage areas and ecology. Neither Brandegee nor his wife ever tried to get the entire flora of any region. Such a thing as combing a region for everything in it never seems to have occurred to them.

This is why I found so many species of plants in Lower California that Brandegee missed. No doubt he saw them as I did, but his attention was focussed differently.

It was not long after their marriage when the Brandegees began "Zoe", the only highclass magazine on the Pacific Coast. It was evidently intended to be a biological one, but zoologists and botanists are like water and oil, they dont mix, and so the zoological part died a-borning.

Mrs. Brandegee was the inspiration and the force behind "Zoe", and she did a remarkable piece of editing and proof-reading, and all without previous experience or training. Her capacity for critical work was shown by her masterly handling of Greene's proposed new species and genera. It was a coldblooded presentation of the facts, without bias, and colorless so that no one would ever suppose that it was a woman that wrote it. There was no reply possible, and all Greene could do was to call her names privately, which he proceeded to do. Greene's position was that. since he was an ordained minister, any attack on his acts was a sin against God, and the act was therefore devilish. Doubtlesss this was the cause of his hatred for those whom he could not use. I have found this attitude the prevailing one among ministers, though generally camouflaged by specious verbiage.

Mrs. Brandegee was specially interested in the genera messed over by Greene because she had worked on them with him before the split. These, among others, were Gilia, Eritrichium, and Californian genera in general. Her conclusions were the result of exhaustive study, and this caution was the cause of the chaotic condition of her work when she died for her memory was so good that little was put down in writing, and when the hand of death struck all was lost.

Knowing Mrs. Brandgee at her best, as I did, by days of the most critical conference, I am prepared to say that she was the greatest woman botanist that ever lived, a genuine genius for research. I have known two such men, one a philosopher, the other a business man. Her worst sin was excessive caution, which led her to put off publication too long. We could do without ninety percent of the published stuff and not miss it, but not hers. All her interest, in later years, centered in botany, except for a series of futile experiments to solve the riddle of sex.

No one who attempts to publish a botanical magazine for the love of it has any conception of the slow, and lingering death involved. All the mental carrion birds swoop down from the oblivion to which Nature has assigned them, and croak at your every issue, poisoning your policy, without anything wholesome in its place. Such people are a constant eyesore for their business is to croak. When the Brandegees appealed to me to continue "Zoe" I did not have on my martyrial robes, in fact had lost them years before, by other martyrdoms. The discontinuance of the journal was the end of her publications as such, though she may have overseen her husband's issues.

The extra leisure she now enjoyed enabled her to go east to inspect types. For two generations western botanists have been exasperated by the relics of the Linnæan slogan that no description shall contain more than ten words. This stupid fad had led Gray and Watson to make fools of themselves in describing western plants, so that we could not be sure of our names till we had seen the types in the east, for the identifications of those men were not always reliable.

So she started east, and made her first stop with me in Salt Lake City where she went over many of my types, spending some days discussing various systematic problems with me. Then she started east and got as far as St. Louis when her infirmity (diabetes) became violent and she had to go home at once. Being a doctor she knew that to be at home was her only salvation. A few years after she tried it again, and nearly died before she got home. It seems that she got worse rapidly and died soon. She was convinced that there was no hope, and yet in the face of death made no effort to put her botanical house in order. I can understand why because she felt she owed the world nothing. To one like myself who believes that our first duty is to make the world better for our having lived in it, this seems a crime.

It was said of Mrs. Brandegee that she was beautiful in her early days, but I doubt it because of angularity, she may have been handsome, but too angular for beauty, but as I remember her she was erect, showing her age (over seventy) only in her long gray and unkempt hair, and angularity. She had on a mother-

Hubbard calico dress, old leather slippers and no stockings, and her long gray hair hanging in stringlets down her shoulders. In most cases like this women so caught would flutter around and ask to be excused to dress up for a stranger like me, but not she.

Ne apologies were necessary, I was not there to see her clothes, though men usually take in everything visible. 1 stepped up to her and said "Mrs. Brandegee ? I am Jones." All social matters vanished and we began on botany. It was a botanical paradise, rare flowers blooming on all sides, mockingbirds, quail calling, and other native songbirds making the air musical with song. I spoke of it to her and she agreed with me, but said the climate did not suit her health and they were too far from libraries, and they were going back north.

She then took me into the brick herbarium and showed me the library and botanical material, and introduced me to Brandegee.

This was my first meeting with them.

About all the femininity there was about her was her long hair and dress. Her face was a powerful one without suggesting dominance, which instantly rouses my antagonism. It was a judicial face, and all her conversation was the weighing of the evidence of the validity of species of plants. There is but one other woman that I know who has the natural capacity of Mrs. Brandegee, but she has not yet found herself.

I shall never get over the feeling that it was a monumental sin for her to die when she did. There was no excuse for it. She was a doctor and knew that the first law of Nature is self-preservation but all her life she treated her body shabbily, and at the climax of her life, when she should have been at her best she was snuffed out like a candle iu the wind. Everyone owes it to himself to do for his body all that is necessary to keep it in perfect health, and must not abuse it by demanding more of it than it can do, but many of us who had to struggle with poverty, and endured all sorts of hardships and privations to win our places in the world do not always observe the laws of health, and though she is long-suffering Nature makes us pay the price, and the cost to us sometimes is terrible. No-one who neglects his body has any valid excuse. I know for in my boyhood days I became aware that I inherited certain tendencies and weaknesses that would take me off before my majority, but since life was dear to me I became an athlete and worked out of me all the harmful germs, so that now at eighty I could run a footrace with men twenty years younger or climb a mountain with men forty years younger than I.

In "Desert" I have written more about Mrs. Brandegee.

Neopringlea.

In his Shrubs and Trees of Mexico, Standley, in a footnote, p 706, says the following: "perhaps the best known and most industrious of north American botanical collectors (Pringle) It has been estimated that during his 35 years of field work he distributed to the herbaria of the world over 500,000 specimens." I do not want to detract a jot from my friend Pringle's reputation, but he himself would not tolerate any such gross misrepresentation. As an "industrious" botanist Pringle did not compare with C. F. Baker, and he never distributed half as many specimens as I have. Standley is always going off at half cock.

Where Pringle shone was in the unequaled quality of his specimens, and for this very reason he was not a good field botanist. No one can be who is fussy about the quality of his material. He never would collect a species unless the material was just right, and so he failed to get many desirable things, so that though he botanized at and near Guadalajara, Mexico for nine years I got over twenty new species there in 1930. If he had done good work no such thing would be possible.

W. N. Suksdorf.

At this writing (October 1932) there comes news of the death of Suksdorf, by being run over by a train he was trying to board. It seems he was 82 years old and crippled by rheumatism so that he did not get off the track soon enough after flagging the train.

He recently made himself odious by publishing 100 new species carved out of Amsinckia intermedia, a-la-Greene. He never seemed to have discovered that Greene and Rydberg are botanically dead. One would expect to find more sense than that in a field botanist, but some people are hard to convince without a club.

Suksdorf lived in the Columbia Basin most of his life, and also was, for a time, an assistant of Gray at Harvard. He was always a hopeless splitter.

Abrams's Floras.

In my criticism of Abrams's botanical work in my Contributions No. 15 I did not discriminate between the two floras, but my objections were chiefly to the second edition of the Los Angeles flora. His larger work camouflaged under the title of Pacific coast flora is a piece of botanical piracy violating the ethics of the profession. I hold no brief for Jepson, but even he has some rights which decent people are bound to respect.

NEW SPECIES AND NOTES.

Allium Elmendorfi n. sp.

No. 29071. Elmendorf, Tex. Apr. 3 1932. This has been confused much with A. scaposum Bth. of the Sierra Madres of Mexico. Stems slender, delicate, erect, 6-12 inches high, growing in clumps, with 3-4 linear and very slender leaves half as long as the stems, and erect from very long and hyaline sheaths 3-4 inches long. Bulbs ovate, ½-3½ inches long, and becoming oblate by the production of many oval and acute bulblets from the bas e and wiithn the outer bulb-coats Bulblets all stipitate on a stalk 1-6mm long, about 5 mm. long and whitish. The two outer bulb-coats rather thick and brownish, with very irregular transversely-rectangular meshes with very finely tortuous walls, as in A. Palmeri. Then come several papery, white and very thin coats with very faintly-linear and vertical meshes with smooth (not tortuous) walls.

It is well to say here that the special (marked) coats have a central and mostly thicker part with the peculiar markings (see my Contributions No. 8, figures) and closely investing it on each side is an excessively thin subsidiary coat or lining with faint and vertical meshes. Sometimes these coats separate from the special one but their markings have no significance. rarely they are so dense as to obscure the central one as in A. fimbriatum. Sometimes there are more than two between the special ones, as in this case.

Umbels small, 10-15 flowered, with two ovate and hyaline bracts over half as long as the pedicels. Pedicels ½-1 inch long, lax.

Flowers white, with the ends of the perianth inclined to be red on the nerves. Segments oblong to ovate, obtuse and very thin.

Stamens included. Crests apparently none. This corresponds fairly well with scaposum except the markings of the bulb coats

Bulbs not splitting in age. It is very likely that this has been mistaken for scaposum or Palmeri. The bulb coats of Palmeri are thicker and do not slip up on the stems as these do, and there are not the long and hyaline sheaths or papery inner bulb scales. I have scaposum from the Sierra Madres of Chihuahua, near Hartweg's type locality, and it is not this same species.

Allium mutabile Mx. No. 29072 from below Laredo Tex. and 29073 from Kingsville Tex., both in 1932. It is evident that this species needs more information about it. The two characters that seem to hold are the very thin and hyaline perianth and the very coarse reticulations of the bulb coats which are evident on all the outer coats to the very base. In addition the bulbs are often an inch in diameter. The perianth segments are also rarely 6 mm. long. Another character that seems valuable is in the production of bulblets at the base of the main bulb as in the species above. A. Nuttallii and reticulatum do not reproduce by bulblets but by fission of the main bulb.

Allium Nuttallii Watson No. 29076, Eagle Pass Tex., 29077 Beeville Tex. and 29078 Winterhaven Tex.

Tillandsia Baileyi Rose, No. 29079 Port Isabel Tex. This is about the type locality. It is described as having the ieaves covered with a "scurf" below. This consists of innumerable concave and hyaline disks with black centers, about ½ mm. diam., overlapping eachother. It seems to be a good species.

Schœnocaulon Drummondii Gray, No. 29080, Beeville Tex. This is described as having fibrous hairy bulbs. The bulb coats are fibrous at top but hyaline-tunicated below and very thin and onion-like, and with very many vertical and slender ribs 1-3 mm. apart, and the rest of the tunic very finely and vertically striate-veine with narrow, transverse and rectangular meshes. Bulbs often 2-3 inches wide aud 6 inches long, and deep-seated. Leaves very finely striate-veined with raised ribs.

Allium reticulatum var. ecristatum n. var.

No. 29074 Beeville Tex. Ovaries crestless. Plants about a foot high and slender, with 2-4 leaves which are a little shorter than the stems. Bulbs ovate, barely an inch long, white, propagating by fission; with brown, evenly and finely reticulated coats which are not solidified below. Pedicels 1-1½ inches long. Flowers 10-15, about 6 mm. long, with segments lanceolate-acuminate, eqnaling the stamens and strongly pink-ribbed. This grows in large areas at Beeville. Plants which I have referred to Nuttallii but are reticulatum are nos. 25980, 25978 and 25981.

Thelypodium Tularense n. sp.

Tulare Cal. M rch 10 1032, on the plains. This belongs to the laciniatum and lasiophyllum group with flat petals, too close to Sisymbrium. Strictly erect annual, with lanceolate, laciniate and toothed leaves with tapering petioles and no auricles, leafy up to the short and bractless racemes. Flowers yellowish-white, about 4 mm. long, with broad petals. Pods filiform, variously kinked, finally reflexed, about 2 inches long by 1 mm. wide, not angled but torulose, sessile, acuminate into the short style. The stems unbranched.

Encelia lineariloba n.sp.

No. 29410. Laredo Tex. March 23 1932. A much branched and erect and slender shrub, 2-3 feet high, growing on embankment by the side of the road, also gathered at Dryden in 1931. Leaves laciniately dissected into 2-3 pairs of linear-acuminate divisions 1-2 inches long, with revolute margins ashy-white below with minute hairs. Leaves 2-3 inches long and nearly sessile, alternate,

very many. Heads single and terminal on long peduncles, leafy bracted below, rather depressed-globose, half an inch wide, with many linear and closely pressed rough bracts about as long as the short flowers. Rays many, yellow, fully half an inch long. The akenes truncate, smooth, quadrangular, slightly larger above. Pappus none.

Brickellia Shineri n. sp.

No. 29411, on the Sabino river Mex., 80 miles west of Laredo Tex., March 26 1932. Plants growing in tufts about 3 ft. high and erect but with many spreading branches above. Whole plant rather glutinous, short-hairy, green, weak, leafy. Leaves cordate-ovate, 2-3 inches long (exclusive of petiole), shortly-acute, thin, somewhat doubly and coarsely or laciniately toothed, teeth few, abruptly contracted at base into a deltoid area which ends in a slightly winged and filiform petiole about as long as the blade, minutely hairy and with petiole very hairy with kinked and spreading and flat hairs. Branches and stems equally hairy. Plants throughout appearing as if glutinous. Stems ending in small clusters of few heads on short and filiform peduncles. Bracts lanceolate and acuminate into needle-like tips, rather imbricated and passing into those on the stems. Heads not pendulous, 6-8 mm. long, white flowered, less than 10-flowered. Akenes 5-angled, black, slightly pilose, about 4-5 mm. long. Pappus white and sparse. Growing in the woods. This has the general appearance of B. grandiflora but leaves not at all acuminate, and heads smaller. Dedicated to Mr. Shiner, an enthusiastic botanist of Laredo who accompanied me on the trip and also enabled me to get many rare plants in the region.

Tradescantia Texensis n. sp.

Growing in moist places along creeks and often with T. scopulorum at Roosevelt and between Kerrville and San Antonio Tex. Stout, erect and tall plants, entirely smooth throughout. Stems rather nodose at the joints, with few and short branches. Upper leaves ovate , 2-3 inches long, short-acuminate, the lower ones inclined to be linear-acuminate from a broad base. Flowers few, in a dense umbel, about half an inch long. with narrowly elliptical sepals.

Rhus Florita n. sp.

Florita mts. New Mex. Sept. 7 1903, Jones. No. 86113 Pomona Herb. Leaflets linear, apiculate to barely acute, smooth, sessile, with the rachis conspicuously winged. Evidently near to R copallina.

In the following descriptions of mostly Mexican plants, for saving space details of locations are omitted and given here below as follows: Cabo is San Luis del Cabo, 14 miles east of cape St. Lucas Lower California, Sept. 14 and 15 1930.

The Borrego and Pelota ranches are in the foothills of the La guna mts. Lower Cal. The Cayuca and Arroyo Undo and Primiera Agua ranches are in the Sierra Gigantas west of Loreto. The Laguna is the prairie in the top of the Laguna mts., lower temperate life zone, Triunfo is 44 miles south of La Paz, and Cacachilla mts 20 miles south, all in L. Cal. Guadalajara Jalisco is the city, and LaBarranca is 5 miles southwest of it, and Orendain 20 miles northeast of it.

Selaginella barrancae n. sp.

La barranca Guadalajara Jalisco, Nov. 25 1930. Growing loosely matted, in moist places in the shade. Leaves flat, almost round, about 2 mm. long, smooth, slightly imbricated at least above, marginless and mostly blunt, but some of the upper white-apiculate the forming fertile spikes seemingly short and with imbricated and apiculate leaves. This would at first suggest S. saccarata, but leaves decidedly different.

Pellæa intromarginalis, of authors. Judging from herbarium material, there is a great variation in it. In young fronds the indusium is beautifully fringed and lacerate, and in older ones it is split up as in Cheilanthes. In Manzanillo material of my own collecting, the sides of the pinnules are strongly serrate, but in my Guadalajara material they are without a trace of serration, and the sporangia extend out beyond the indusium like a fringe of hairs. The fronds are conspicuously vein-ribbed as in some Aneimias. The spores are black and globose.

Polypodium Scouleri H. & G. Jepson, Man. 29, says this has ovate fronds with oblong pinnæ. I find the fronds are normally lanceolate, and rarely ovate, and from a few inches to a foot long, and with stalks as long as the fronds. The freshly ripe fruit dots are lemon-yellow, very large and in age becoming blackish. The pinnæ are rarely oblong, but normally nsrrowly oblong to almost linear and obtuse and very obscurely and obtusely dentate. The root scales are the same as in P. Californicum, that is, chestnut-colored and subulate-triangular and papillose, aud ending in a thread, and shining. The plants form large colonies where possible, on horizontal branches of evergreens, sometimes going almost to the tops of tall trees, and then again being small and stunted on rocks or near the ground. This plant"s home is in the fog-soaked areas along north-California coast in dense forests from near Eureka and northward, but grows sporadically as far south as Santa Cruz island.

Lomaria spicant Desv. Jepson l. c. 34 says "Leaves erect" (meaning sterile ones). I find the sterile ones are normally flat on the ground, while the fertile ones are strictly erect from a central tuft.

Pinus monophylla Eng. The type of this species has entire and single leaves, rather long-acuminate, normally 3 inches long. Engelmann, when describing it, mentions the fact of its having 2 leaves also, and says that the seeds of the type are larger. This has led some botanists to call the 2-leaved forms edulis, but that species does not have single leaves at any time, while all trees west of Colorado have some single leaves among tha rest. There is no character of value in the difference of size of cones or seeds nor in habit or size of trees, for there is a variance of 50%. The Great Plateau plants usually have longer leaves than true edulis, but rigidity is what keeps this group distinct from the cembroides class. I see no way to keep up edulis as a species, and many years ago I proposed the name P. monophylla var edulis, Zoe 2 251 1891

Pinus edulis Eng. This has been reported from the San Jacinto mts. and in Lower California, but I doubt its existence within 500 miles east of there. Everything seen so far is the monophylla form. I have never seen the true monophylla till last year at Frazier Park, near Lebec, which is really on the desert slope, where all the trees are typical 1-leaved forms. These trees will average a little bigger than the usual desert forms because of higher humidity.

Juniperus. The species of this genus are in a hopeless state of confusion, due to such closet botanists as Sargent. The chief trouble has been in the occidentalis gronp, and is assumed to contain Mexicana. Engelmann clearly places this with the big and red fruited Californica, and has slender branches and squarrose scales. What the Texan botanists call this species has blue and small fruit and must belong to the occidentalis group. This has been chopped up, on trivial characters, into three times as many species as exist.

Paspalum tenuissimum n. sp.

27584, on the prairie at the laguna, Laguna mts. L. Calif., lower temperate life zone, 6500 ft. alt., and along the down trail, Sept. 22 1930. Plants barely 6 inches high, and with the filiform stems in small tufts an inch or a little more wide, as if stoloniferous, but apparently not so, in granite gravel along with Bouteloua oligostachya, etc. Leaves clustered at the base, from short and broad sheaths, the blades 1-3 inches long and about 1 mm. wide. Whole plant smooth. Stems 3-5-times as long as the leaves and threadlike, and leafless above the base, terminated by a single falcate spike about 3 inches long by 1 mm. wide. Flowers ashy-roughened, without glumes. The large palet appearing as if enwrapping the very uarrow upper one, linear-lanceolate, 2mm. long and acuminate, and with a wide and rigid white midrib on a very dark ground. It is strange that Brandegee and Goldman did not get this very common grass on the Laguna mesa.

Cyperus Guadalajaranus n. sp.

No. 27603, Guadalajara, Mex., Nov. 26 1930. Plant apparently near C. Gatesii Torr., and with the habit of aristatus. Filiform annual, a few inches high and erect, and with relatively broad leaves shorter than the filiform stems. Spikes capitate at the ends of the stems, 20-50 in a head, and sessile or nearly so, sometimes with capillary rays one to few bearing smaller heads. Spikes .5-1 inch long by 2 mm. wide, straight, a little tapering, brilliant-chestnut colored, flat, with the scales about 1 mm. long, and with very prominent and green mid-nerve ending in a short and rather recurved awn, with a single nerve. Flowers rather deciduous. Seeds triquetrous and about half as long as scales.

Cyperus aristatus var perennis n. var.

A densely tufted perennial growing on the Laguna mesa along with Paspalum n. sp. Stems and leaves about equal in length. Flowers rarely more than 10. Scales uncinate. Plants about 4 inches high. No. 27595, Laguna mts. L. Cal., Sept 22 1930.

Cyperus Barrancae n. sp.

No. 27601a, La Barranca, Guadalajara, Jalisco Mex., Nov. 23 1930. Plants near C. Surinamensis Rottb. Whole plant smooth, erect, perennial, with elongated and narrow leaves. Heads yellowish, linear, about an inch long, congested at the ends of unequal and mostly short rays, but with 10-15 heads sessile on very short secondary rays. Flowers early deciduous and leaving the conspicuous, chestnut-colored, serrate, and capillary rachis appearing as if a pedicel. Bracts ovate, obtuse, or barely apiculate, with only the central nerve or a trace of a lateral one, smooth, about 1 mm. long. Flowers about 50, in an arcuate head.

Fuirena Primiera n. sp.

No. 27604, Primiera Agua near Loreto L. Cal., Oct. 19 1930. Erect perennials, leafy to the top, and with all leaves having short sheaths, linear-acuminate, 1-4 inches long by half an inch wide, smooth and striate or the lower ones ciliate, glaucous. Heads sessile in terminal clusters, much resembling Scirpus maritimus, oblong-ovate and acute, about half an inch long, very densely flowered. Scales oval, emarginate or abruptly contracted into a stout and white awn half their length, margins hyaline and lacerate and softly and very minutely hairy. Akenes minute, triquetrous, shining-yellow and sharp-edged, strongly apiculate by a stout style. growing in water in a little pond and along a ditch. This is likely the same as got by Brandegee at Comondu not far away.

Eleocharis capitata R. Br. 27606, Primiera Agua near Loreto L. Cal., and 27597, Borrego ranch. Laguna mts. L. Cal.

Carex Lagunensis n. sp.

No, 27592 The Laguna Laguna mts. L- Cal. Sept. 22 1930 on dry mesa in dense tufts, about a foot high. Stems strongly striate and sharply triangular, filiform, leafy below but surpassing the narrow leaves which are 1-2 mm. wide. Heads about 4, aggregated, erect, sessile, ovate to oblong, 6-8 mm. long. Bracts scale-like, the lowest only prolonged into an aristiform tip 1 cm. long. Scales oval-o-ovate shortly acuminate tip almost as long as the akenes, chestnut colored aud with strong and green mid-nerve, and narrow, white and hyaline ma.gins. Akenes very flat-lenticular, green, ascending, compactly packed, 3.5 mm. long, oval-ovate, little wider than the scales taper-beaked, rather strongly 1-nerved and with faint laterals, strongly flat-winged and hispidulous on the margins, the oval seed occupying about half the width and length of the akene. the akenes remind one of the straminea group, though much smaller, Plants related to C. illota

Carex longissima n. sp.

No. 27594, growing in clefts of rocks on the trail down the Lagunas, in dense tufts, about the lower edge of the Middle Temperate life zone. Stems and leaves thread-like and nearly equal. Spike single and terminal, abont 3 inches long by 2mm. wide, chestnut colored, flexuous, pistillate on the lower third, very dense above with imbricated and triangular scales about 4mm. long aud closely packed, the pistillate scales a little wider below and inclined to be awn-pointed and nearly twice as long as the oblong and lenticular and rounded and pubescent and nerveless akene which is closely appressed and abruptly contracted into a round beak half as long as the body, the whole 3 mm. long, scattered, early deciduous.

The Palms.

In my former Contributions I have tried to clear up the confusion about the generic identity of Erythea and Washingtonia. No character giveu by Watson can hold I have visited the regions in which they grow wild and have checked up on the myriads in cultivation, and find certain errors. Brandegee was an accurate observer and seldom erred, but he speaks of Erythea Brandegei as common in the Lagunas, but I searched for the pipestemmed species there in vain. Washingtonia is everywhere but the other is absent.

When not in bloom they are hard to distinguish, but the fluttering of leaf-segments of W. Sonoræ in the constant wind at the Cape and the green leaves and white strap-like bracts of Sonoræ should identify it. Now our knowledge of Erythea is from cultivation. but the genus is known from such plants mostly as E. edulis and armata and growing in the wild. They are such slow-growers that they are not favored by dealers, but seeds are widely scattered, and the craze for growing palms still persists among newcomers. Fifty years ago seeds of edulis were planted in California hen came Washingtonia and armata, then elegans- came from So

nora and grown by Mr. Rock at San Jose. So far there is but E. aculeata Brandegee left, but not cultivated. Watson's characterization of Erythea was a failure. I have sought good generic ones that will hold. The floral character that I suggested falls down, for the flowers are so small that the segments seem united but are not in fact so. No character has any distinguishing value except those of floral bracts and seeds. The bracts of both genera are split down one side from the tip, but produced only in Washingtonia into a long, white and strap-shaped blade, but in Erythea they are very short. The seeds of the former are very small, rarely .5inch long by .25 wide, oval-oblong, and round in cross-section and sulcate ventrally. Seeds (fruits) of Erythea are about spherical when fresh, but the seeds when stripped are oblique flattened on the chalaza end, and in E. Loretensis are lozenge-shaped, but 3-4 times as large and never oblong in outline. The outer pulp of Washingtonia is black when ripe and should be sweet and edible like the date, and at maturity peels off the seeds easily. The outer covering of Erythea is pulpy and reddish in all the species before maturity, but edulis and Loretensis are black when ripe, and appear almost spherical, but the seeds vary, in edulis they are not much different, the seeds are about globose and rough, but are lenticular and much obcompressed and shiny-black in Loretensis, but the pulp is as thick and as edible, but the fruit is a half smaller. E. elegans and aculeata are dwarfs in all probability, leaving armata and Brandegei as the only remaining trees. armata has glaucous leaves which make it seem blue, and has long and whiplik peduncles and linear panicles long-exserted and twice as long as the leaves, but Brandegei has green leaves and included panicles the pulp pithy and reddish as in armata also. The panicles and fruits of aculeata are described by Brandegee as like edulis.
Seeds of elegans are not "pyramidal", as described by Beccari, and fruits nearly spherical, and the panicle linear. as in armata, but coming out near the top and erect, not drooping as in armata E. elegans and aculeata have prickly petioles as in armata and the leaves persist for years and are not selfpruning as in edulis, and the fruits about the same size and shape as in armata.

ERYTHEA KEY.

(This is to replace the one offered in Cont, 15p 53)

Inflorescence not exserted nor narrow, ovate, not interrupted.
Leaves green. Fruits black, with juicy and edible exterior pulp. Fruits about spherical
Fruits 2 cm. wide and with seeds nearly round.
Leaves unarmed, inclined to be deciduous 1 E. edulis

Leaves armed, persistent. 2 E. aculeata
Fruits not over 1.5 cm. wide. Seeds lozenge-shaped
3 E. Loretensis
Fruits reddish, not over 1 cm. wide. Petioles flattened. Leaves armed. 4 E. Brandegei
Panicles exserted, linear, interrupted. Fruits reddish, about 1.5 cm. wide, not edible. Leaves glaucous.
Panicles erect. Dwarfs 5 E. elegans
Panicles drooping and elongated.
6 E. armata

Tht there is some d oubt concerning E. elegans is shown by the letter of Beccari to Mr. Wright of Riverside, reproduced here.

"Florence, Royal Museo, Via Romana 19

My Dear Mr. Wright.

On my return to Florence I have examined the fruits you sent me, under the name of Erythea elegans Franchesi, and to tell you the truth they resemble those of E. armata, at least they correspond exactly to all the fruits which I have received with this latter name. The fruits of Erythea elegans which Dr. Franchesi himself sent me have a form distinctly pyriform. If you cultivate as E. elegans the plant which produces the fruits which you have sent me, I would be curious to see your E. armata.

Nov. 8 1911"

"Notes on Erythea elegans Franchesi by J. Harrison Wright

First noted and named by Franchesi as a new species when he offered small seedlings in his catalogue about 1902. First published by Dr. Beccari from material sent him by Franchesi in "Palme Americane" Webbia Vol. 11 in 1907 as a valid species.

The original type plant was in the garden of a Mr. Buddington on College St. Los Angeles near the Sisters" Hospital. It was planted in the eighties as a small seedling from John Rock's nurseries at San Jose. Beccari's description is in error as to the petioles which he calls "smooth" He had only a leaf from on of Franchesi's young plants. The petioles of mature plants are really as thorny as in armata or Brandegei. The palm is of exceedingly slow growth and bears fruit when only 3 or 4 feet in height, which seems to indicate a very dwarf palm at maturity. The flowering spadices are carried erect and well above the crown, only when weighed down by the growing fruits."

There is but one conclusion to draw and that the plants grown by Mr. Wright from the Buddington type are hybrids of a smooth dwarf with E. armata. The seeds of elegans came from near Hermosillo Sonora, andaculeata from Cofradia, not far off.

Modern progress has destroyed the type of E elegans for the Buddington garden is no more, and its plants killed, all that is left of the type is the seeds grown by Mr. Wright and the Huntington Garden, three plants, two dwarfs 35 years old and not eight feet high and a tiny plant in the Garden. The Wright plants are mature and fruiting copiously.

Erythea Loretensis n. sp.

Type locality, the corner of the block south of the schoolhouse in Loreto, L. Cal., a single, vigorous tree 25 ft. high, with persistent and appressed leaves as in E. Brandegei and similar inflorescence. Fruits black and edible, with pulp .25 inch thick and separating readily from the single seed which is shiny-black and so flattened at the poles as to be lozenge-shaped. The fruits seem spherical, but are very oblate, measuring 13x16-18mm. and the seeds 12x8 mm.,with a central pit 1 mm. deep and the outer pulp loose from the seed and with a papery skin

Fruits of edulis are depressed-globose, 20x15 mm. with pulp closely adhering to the reddish seed.

The stipular sheaths of edulis and Washingtonia are nearly a foot high and twice as long and half an inch thick and make fine packsaddle pads, preventing blistering in the intense summer heat.

There seems to be a good variety in a form of Brandegei distributed by B. from the Cape which we may call **var. spiralis** in which the leaves are arranged in conspicuous spirals on the trunks.

Beccari's armata var,microcarpa seems a good one, with the linear and drooping panicles not so conspicuously exserted and with small and greenish flowers and small and oval reddish fruits 15x10 mm· dimensions.

Allium

In a recent trip to Cuyamaca lake Cal,, south of Julian, at an elevation of 4500 ft. I found two Allia growing in the open A. amplectens and Parryi. The former grows singly, or in twos in the interspaces, in gravel, along with Calochortus, Thermopis, Godetia, etc. The soil was a little clayey, bnt mostly gravel, and inclined to bake. The bulbs were about 4 inches in the ground their method of extra propagation seems infrequent by the splitting of the bulb. The stamens a little exserted. The flowers are globose and very thin and abont closed and always white. The heads are mostly an inch wide and rather dense. The leaves are

several and very long and narrow. The bulb coats are brownish without and mostly deep-red within. The stems are 5-10 inches high and erect.

Allium Parryi grows abundantly on wash land where the rains have washed the clay down to the more level gravelly soil, and below where the other onion abounds, The leaves are single to each stem, and arcuate. The stems incline to be ascending and rarely are over 4 inches high. The flowers are about 8 mm. long, and whitish and open. The bulbs are nearly spherical, and rather reddish. The outer perianth segments are reddish-striped and triangular-acute and somewhat outcurved. The pedicels are green and thickened upward. The crests of the ovary are raised and thick and on the angles. The bulb scales differ. There is a very thick and opaque one and then a thin one like the transparent outer skin of coats with markings, and having the usual vertically-oblong cells of such skins, then another thick and red coat and so on. Once in a while a person can make out faint vertically oblong or nearly square meshes on the thick coats as in Sanbornii but Parryi does not belong in the fimbriatum group with which it has been put. Sanbornii differs from Parryi chiefly in the oblong, rounded and obtuse perianth segments. The bulbs of both species split through the middle as a means of extra propagation, and are red.

Allium amplectens is well marked by the slightly exserted stamens and the pure white and globose flowers. The bulbs are scarlet within and split down the middle in age.

Allium dichlamydeum Greene was put as a possible form of serratum in my revision, Greene's species as a rule are spurious, and his characters visionary. I found it growing on a sea-cliff at Mendocino City It is probably common along the Coast. The cliff where I got it is a flatiron shaped piece of upturned Tertiary strata, forming an area few rods square and covered with loose soil, mostly sand with a coat of rather dense fibers of decayed or decaying roots, the bulbs being a few inches below the surface and single and seemingly not propagating by runners, rhizomes. Since the type locality is "seaward slopes" near the Mission hills of San Francisco my plants from a remote region may not be typical. Greene says there is a remarkable difference in the floral segments, which I do not find in mine. Jepson in his "Manual" p 220 discredits the perianth story by saying the segments are almost equally spreading. Neither writer mentions the bulb scales, but Jepson says the two bracts are united high up and pedicels are stout. Neither do they speak of the flowers being a very deep-red-purple like serratum and acuminatum, and of the rigid segments. The crests seem to be central. The meshes of the bulb coats are

conspicuously arcuate, much more so than in Jepson's figure of peninsulare, and about the same as my no. 41 of attenuifolium, and like that, very irregular. There is no sign of serration on the margins of the segments. The bulbs are small, rarely half an inch wide and spherical and with gray coats. The plants grow in dense masses so as to color the hillsides red and are 6-12 inches high with fat and rather narrow leaves. Growing with it are Brodiæa, Gentiana and Godetia.

Allium Parishii Watson was very poorly described and its type locality inaccurate as Cushenbury spring. It does grow far above the spring in the alpine regions, and is the same as monticola of Davidson, and which I fully described in Cont. 15 p 52. Parish was responsible for the confusion.

In 1931 I had an exceptional chance to observe Texas onions the roadsides and waste places were white with them for many miles, the plants are as a rule 6-12 inches high and erect and with long and grass-like leaves to a stalk or peduncle. The bases of the leaves are enlarged and sheath-like and usually ribbed and overtop the peduncles. This applies to the mutabile group, the most common one, reticulatum belongs in this group but is conspicuously crested and the perianth elongated and dries bluish-purple. The roots of all the species but scaposum propagate by division of the mother-bulb by the production of a bulblet arising from the lower edge just above the roots, which grow downward and make the parent bulb appear oblique till the bulblet splits off. The bulblets also develop from below the sheathing scales and are white, while the mother scales are mostly chestnut-colored. The distinctions of Small in his southern states flora do not seem to hold out. His Helleri certainly is Nuttallii. His Cuthbertii seems to be reticulatum, anh arenicola and microscordium are hopeless. Mutabile and Nuttallii seem separable on the texture of the flowers, but their color is worthless, Nuttallii is mostly white at low elevations, and pink elsewhere, mutabile is mostly white. and with a more robust habit and the lax perianth and very fibrous bulb scales with open lace-work throughout. Nuttallii has the lacework of the scales consolidated into a straw-colored area below the middle. Nuttallii forms a new bulb by splitting of the mother one and the downward extension of the parts from the parent, the new bulbs pointing forward, often making twin peduncles. The bulbs of mutabile are usually twice as large as in Nuttallii, often an inch wide and spherical to ovate. The perianth segments are rather narrower than in Nuttallii and the leaves are often 5 mm. wide. The segments of Nuttallii are narrowly elliptical rather than lanceolate as in mutabile, and do not crinkle as it does. The color of the flowers is no character of any value.

Allium Coryi Jones I found abundant at Madera Springs on gravelly and sandy slopes on the edge of the live oaks on the north side of the Davis mts. The type locality was at Alpine on the southern side. The flowers are often tinged with red.

Allium acuminatum Douglas grows in the hills near San Simon Ariz, a locality quite out of range.

Allium hæmatochiton Watson was said to have a rhizoma, and has been a puzzle ever since, but an examination of the type reveals no rootstock. It seems probable that Watson inferred one because of so many scales, but there is none. This throws Davidson'sMar vuu into synonymy. The name, a poorly constructed one was meant to refer to the red bulb scales, but they are sometimes white. It is easy to imagine a rootstock is present when it is absent, but the many coats are not connected by a rootstock.

Allium Bigelovii Watson has the oblong meshes of the bulb coats rather oblique at the ends and arranged in many lines, and the walls are raised much after the fashion of acuminatum, forming deep pits. The vertical lines of the meshes are obscurely sinuous. The bulb coats are firm and not flabby. In the dry specimens the crests are very thin and triangular, ½ mm. high or more and not spongy. The leaves are mostly two, but sometimes only one, None are enlarged upward, but they overtop the inflorescence It propagates by bulbiets produced from the lower corners of the mother bulbs, and not by stolons.

Allium stellatum Ker. was out of place in my revision for it goes with cernuum and not reticulatum. It has the long and narrow bulbs with long neck peculiar to the cernuum group, and the vertically linear close-set meshes of it. The peduncles are not fistulous nor hooked, and the leaves are grass-like and four and nearly as long as the peduncles. The pink flowers are very broad and open and about 4 mm. long, with the broadly ovate segments spreading and barely as long as the stamens or a little shorter. The crests of the ovary are on the corners and not close to the style, and are triangular and spongy and about half as high as the pod is long The pedicels are capillary and lax and about an inch long and many. This group is allied to the hæmatochiton-validum one.

Allium glandulosum Link & Otto was got by Mrs. Mexia at Cuarnavaca,4600 ft. alt. no 2726, in open woods of pines and oaks, the usual cernuum habitat. Plants tall and with the same scales and 2-4 leaves. Bracts small. Peduncles enlarged at base. Flowers 4 mm. long, with perianth parts linear and spreading, black-purple. Ovary with low and central crests. Pedicels an inch long, filiform, not reflexed. Bulbs ovate, about an inch long, dividing by splitting, and producing bracted rhizomes 2 mm. thick, with bulbs at the ends. Sheaths 2-4 inches long

Yucca valida Brandegee is the only Cape yucca, and grows normally, in the shade of other brush and rarely is 8 ft high, but west of La Paz is a forest of it where the trees are 30-40 ft. high and branch as brevifolia does, but the leaves persist longer and in age are reflexed so that the swab-like tips are often 6-8 ft. long. The leaves rarely are over a foot long and are flat and thin and with few or no threads on the margins and then serrulate. They are long-acuminate and contracted below. The flowers are about an inch long and rather globose-ovate, but variable and white. The fruit is decidedly juicy when ripe and pendulous. It is clearly a close relative of Schottii if not a good variety of it. My no. 27574 from road to the Cape from Todos Santos west of La Paz.

Hymenocallis jaliscensis n. sp. Jones Mex. no. 458 P.college no.119358. Salcillo, Jalisco, Mex. Juue 1 1892, also at La Palma near by. Allied to H. Caynemensis Herb. Plants about a foot high, erect or ascending,fleshy and thick, from large and tunicated bulbs with brownish scales with filiform vertical cells. Leaves broadly linear, arcuate and acuminate and equitant. shorter than the peduncles, rather many. Corolla tube about 3 inches long and with segments about as long, and a little longer than the stamen. Style elongated and as long as the petals. Fruits many, ovate , 4 mm. long, congested and with 2 hyaline and petal-like bracts 1.5 cm, long which are tapering, smooth, acute, and linear. Leaves very finely striate.

Sisyrinchium translucens Bicknell looks like an Hypoxis, my no. 27570 growing on the prairie at the laguna. Laguna mts. L. Cal

Plants 6-12 inches high, erect, annual or short-lived perennial perfectly smooth throughout. Leaves about $\frac{2}{3}$ the length of the peduncle, very thin and acuminate,4 mm. wide, with 4 strong nerves and twice as many fainter ones, all basal, many Proper peduncles filiform but winged on both sides with wings 1 mm. wide. Spathe 1-2 inches long, with the outer bract a half to twice longer than the inner one and long-acuminate. Flowers normally 3-4, rarely more, on capillary pedicels an inch long, ight-yellow, about 8 mm. long Fruit cordate-obovate, about 8 mm. long and retuse and shortly-acuminate into the pedicels,with very thin walls showiug the outlines of the several rather favose black and oblong to oval seeds 1 mm.long.

Washingtonia filifera Wend has the oue-seeded fruits never spherical nor more than oval, and in age the inclosiug pulp becomes juicy and black, separating from the seed which is rough and yellowish and sulcate on the raphe side or end. The measurement is 6x5x4 mm.

Iresine obtusa n. sp. No. 27360, Borrego ranch, Laguna mts. L. Cal. Sept. 24 1930. A tall and climbing shrub with the habit of 1. interrupta, but leaves oblong-ovate and truncate or rounded at tip and cuneate below into a margined and short petiole, entire. Whole plant perfectly smooth. Inflorescence a terminal and very compound panicle leafy below, of innumerable white racemes, the flowers with obtuse papery bracts.

Iresine pulchella n. sp. Cayuca ranch, Sierra Giganta mts. L, Cal. Oct. 23 1930. A divaricately branched shrub with gray bark and many ovate to lanceolate panicles 4-6 inches long which are white-woolly. Leaves deltoid-ovate, cordate, acutish, 1 inch long entire, rather thick, slightly veiny below, green above but slightly pubescent, densely white-woolly below with branched hairs, on a stout petiole 4 mm. long. Flowers in compound panicles, nearly sessile in dense clusters of 6-8 flowers which are racemose on the branches. Bracts very thin and hyaline, acutish, inclined to be smooth above.

Eriogonum Lagunense n. sp., No 27568. Mts. east of Loreto on the coast, Oct 17 1930. Allied to E. inflatum, but without the inflated stems of E. trichopodum, and with its diffuse and branching habit much accentuated so that the plants form airy masses 4 ft. in diameter, but ultimate branches not as filiform as in trichopodum. Involucres the same, but less deeply indented. Flowers the same but segments inclined to be triangular-oblong and pubescent or puberulent only on the midrib and with margins white, hyaline and broad. Whole plant yellowish, but stems glaucous. Leaves densely strigose throughout, mostly round, rarely ovate, with conspicuous deltoid base, about 1 inch. long. Growing in rocky places from a woody base.

Suæda ramosissima(Standl.) Dondia ram. Standl. N .A. Fl. This grows in saline places No- 27558 Loreto Nov 1 1930.

Allionia and Commicapus Standley. It is interesting to see him back in the ranks of sensible botany again, abandoning his untenable genus. He seems different from Rydberg who was always a mule in sticking to blunders after he had made them. See Field Mus. 2 3.

Drymaria sperguloides Gray. It is not to be wondered at that Coulter got species of Drymaria in Mollugo. The descriptions in the Synoptical Flora are very poor. and specific characters are conspicuously omitted, and the species not at all properly grouped. 1 cannot see any generic relationship between D. holosteoides and crassifolia and sperguloides and the rest of the group. A marked character of the arenarioid species is in the rather rigid and sharp or acerose sepals. This particular group has oval sepals without apiculation or nerves, and with conspicuous and hyaline

margins, about equaling the oval-ovate capsule which is smooth and shining and very finely striate longitudinally with beaded lines and mostly 3-4-valved, and with about 8 large and circinate seeds with coat low-tuberculate-striate longitudinally. This genus I would call **Mollugophytum** and would refer to it D. crassifolia Bth. as **M. crassifolium**, D. holosteoides Bth. as **M. holosteoides**, and D. polycarpoides Gray as **M. polycarpoides** and D. sperguloides Gray as **M. sperguloides.** A conspectus of the proposed genus is given below.

Leaves broad.
Maritime Perennials. Flowers umbellate.
1 M. crassifolium
Annuals.
Petals abortive or very small. Leaves conspicuously petioled. 2 M. holosteoides
Petals conspicuous Flowers cymulose.
Leaves very shortly petioled
3 M. polycarpoides
Leaves linear. Flowers cymulose, with slender pedicels and equally as long common peduncle.
4 M. sperguloides.

Clematis Barrancæ n. sp. Guadalajara, Mex, Nov. 25 1930. Flowers perfect. Leaves bi pinnate, the pinnæ ternate, final segments below inclined to be scallop- lobed below and rather deltoid-ovate and acutish and cordate, 2 inches long. Fruit ashy, with short and stiff hairs, the tails much elongated and thinly plumose. A smooth and high-climber. Leaflets 9-12, rather leathery

Thalictrum peninsulare (Brandg.) Rose replaces T. Fendleri in similar situations in the Lagunas. It is erect and about 3 ft. high, growing singly, and is dioecious. The panicles of flowers are rather small and with capillary rays ending in very small heads of fruit consisting of 1-3 seeds on subulate stipes $\frac{1}{4}$ as long as the seeds which are about 4 mm. long and 2-3 mm. wide. The seeds are really half-oblately oval with one face nearly straight or a little bowed in the middle and with the other face greatly arched. The surface of the seeds is very coarsely corrugated into few and raised meshes, and is not pubescent and has a short and triangular beak. Leaflets rather rhomboidal, 1-2 cm. long and nearly as wide and with variously cut lobes or teeth which are deltoid-acute at tip. It is common along watercourses in the shade. Lower Temperate life zone.

LYROCARPA.

Watson, in the Flora of California Vol. 2 p. 44 says of this genus " pubescent annuals". From his description of L. Palmeri we would infer similarity to the type species. Watson often blundered, as we all do, on species, but this time it is on the genus.

Lyrocarpa was founded on L. Coulteri which is a shrub as shown by me in 1929. It has been found in western Arizona by others than myself near Gila Bend.

SYSTEMATIC POSITION OF SYNTHLIPSIS.

In commenting on the relationship of Synthlipsis the Synoptical Flora says its place is near Greggia, Lyrocarpa, Physaria, and Lesquerella. That it is related to Greggia its nearest ally is manifest for it is uncertain if Greggia can be maintained if variations of it continue to be found like those got by me in 1931. There is nothing in the narrowness of the pods of Greggia to separate the two genera. It appears that Synthlipsis is always an annual, while Greggia is a rather shrubby perennial. The relationship to Physaria, Lesquerella, and Capsella is more remote. Its relationship to Lyrocarpa is fanciful rather than real for the flowers are not alike, and the pod more like Capsella. About the the only thing available to keep the genera separate is the sharp and processed edge of Synthlipsis valves in distinction from the rounded edge of Greggia valves. Pods of Greggia are frequently conspicuously flattened and truncate to emarginate at both ends as in Synthlipsis. and so the distinctions between the genera, at first sight, seem too attenuated to hold. The floral characters are substantially the same in Synthlipsis, Greggia, and Dithyræa except that the spreading calyx is present only in D. Wislizeni and not in Californica. Physaria didymocarpa has rather loose sepals, but not conspicuously spreading. Rose's Synthlipsis lepidota is a Lesquerella, which I would call **L. lepidota** n. n. A meaningless name in this genus for leaves are mostly lepidote. Dithyræa is the most specialized genus in the group because the margins of the pods are processed into winged midribs. while Synthlipsis has a mere midnerve a little produced toward tip of pod as a rule. Greggia has no evident midnerve usually but with pods with rounded margins. The pods of Greggia vary much in cross-section. I think the genus is nearest Lesquerella, and that Synthlipsis is intermediate between it and Dithyræa, while the Capsella-Lyrocarpa group is an offshoot between Synthlipsis and Dithyræa for the pods of both have a mere midnerve instead of a specialized one as in Dithyræa, but are conspicuous in the pods being greatly widened above but not didymous, the Hutchinsia section of Capsella being a connecting link with Synthlipsis. The sepals of Capsella are inclined to spread. The relationship of the group is quite near to Thlaspi and Lepidium.

Cotyledon. Jepson, Man. p. 452 is hazy about the gender of this genus, making it feminine in all his names but edule and insulare, both Gray and Watson assumed it was neuter because it ends in "n" a common neuter term. This shows the folly of men unfamiliar with Latin trying to write Latin names. They should have their censors on the job always.

It should be said of Synthlipsis that the flowers are white and that the claws of the petals are so close together as to appear united making the abruptly spreading blades seem like lobes of a gamopetalous corolla.

Eriogonum trichopes Torr. The more I see of the hairsplitting of Gray in correcting hybrid names like this the less I think of it. Gray was no Greek scholar as shown by his ignorance of the gender of words ending in "omega nu" in Greek, such as Cotyledon. He was a savage and unscrupulous partizan.

Sedum barrancæ n. sp. No. 27845 Under cliffs at La Barranca, Guadalajara Mex., Nov. 17 1930. in wet and loose soil, growing in tufts from long or oblong leaf fascicles 1-2 inches long stem leaves many, narrowly elliptical to linear-elliptical, 1-2 inches long, 1 cm. wide, sometimes acute, entire, sessile. Inflorescence a raceme-like arrangement of short and scorpioid racemes of 6 flowers which are sessile and bracted with ovate to nearly round bracts 5-6 mm. long. Flowers white, but tinged with red or green and about 4 mm. long and wide. Petals cordate-ovate and with acuminate tip and equaled by the stamens which have a wide and triangular base and filiform filaments. Pods 2, acuminate. Stems simple.

Astragalus Piersonii Munz & McBurney Bull. So. Cal. Acad. Sci. Vol. 31 p. 67 ff. The proposal of these new synonyms is wholly unjustifiable for there is ample material in the Jones part of the herbarium for proper indentification of this plant as A. Coulteri It is unfortunate that the indefatigable botanist of Pasadena must have his name hitched to a synonym for he deserves better treatment. This plant is described as an annual, but is perennial as are all the forms of lentiginosus.

A. Crotalariæ var. Davidsonii l. c. is the usual Imperial valley form of Preussii and is matched exactly by a specimen in the herbarium.

A. insularis var. Harwoodii is apparently true triflorus DC.

A. pachypus var. Jaegeri l. c. is said to have yellow flowers but there is nothing in the specimen to show it. There are no yellow-flowered Astragali, but many ochroleucous ones.

They also propose a new variety of A. Douglasii. I have been convinced that none of the proposed varieties are good.

Mrs. McBurney has had no field experience enough to justify an opinion of the species but for years she has had access to my great collection and use of my monograph enough to become familiar with the Preussii to which her proposed species belongs.

Munz seems to be copying Jepson's system of making fake varieties as used in his Manual, a system that he was the first to criticise severely.

Alchemilla hirsuta HBK. It was quite surprising to find this species abundant on the laguna, another link with the western flora.

Pithecollobium minutum n. sp. No. 27265, Cacachilla mts. Oct. 2 1930. An open bush, 6-8 ft. high, with inch-long straight spines in pairs. Leaves nearly as broad as long, 3 inches long, of about 6 pairs of pinnæ which are about an inch long and open and 1 cm. wide. Leaflets about 13 pairs, linear, a little arcuate, 1 mm. wide by 4 mm long, minutely pubescent. Pod nearly black, 4 inches long by half an inch wide and 4-6 mm. thick, and oval in cross-section, smooth, triangular-acute and short-stipitate, with ring-like base. Branches slender and spreading as in Mimosa biuncifera.

Pithecollobium minutissimum n. sp. No. 27266 La Barranca Guadalajara Mex. Nov. 25 1930. A small tree roughly branched and spiny at the nodes, closely short-woolly throughout with rough bark. Leaves 4-6 inches long by 1-1.5 inches wide, bipinnate, with stout petiole half an inch long, and with rachis almost as stout, with the ascending pinnæ about 3 mm. apart and about 40 pairs, each pinna nearly an inch long and nearly sessile. Leaflets about 30 pairs, imbricated, oblong, obtuse, 2 mm. by 1 mm. Leaves clustered at the ends of the stout twigs. Fruit nearly black when ripe, reflexed on a very short and stout pedicel and broadly linear, about 3 inches long, a little arcuate, $\frac{3}{4}$ inch wide and $\frac{1}{2}$ inch thick, quadrangular, obliquely apiculate at tip and cuneate at base, minutely woolly. Flowers absent. Fruits vary from sessile to having a stipe an inch long, my no. 27266a

Pithecollobium acuminatum n. sp. No. 27255 Above Primiera Agua, in the Sierra Giganta, Oct 20 1930. A shrub 4-6 ft high with stems beset with chestnut colored or white warts. Leaves a pair of pinnæ, with about 5 pairs of leathery venose and dark-green leaflets I cm. long by 3 mm. wide, blunt but apioulate, often arcuate, oblong, with midrib set in the middle and with 3 accessory veins below it, half-cordate below, and set on the upper side of the grooved rachis which is, like the leaflets, minutely pubescent. Leaves about 1.5 inches long, with proper petiole stout and 2-4 mm. long, and with a pair of chestnut colored spines 4 6 mm. long at the base, leaves inclined to be fascicled in the axils and very numerous. Pods cartilaginous and nearly round, 4 inches long and .5 inch wide, a little flattened and with uneven edges, long-acuminate on the empty tip, and contracted below into a stout stipe 1 cm. long. Pods dark-brown, with about 5 seeds and no intermediate pulp. Flowers racemose.

Lysiloma Cayucensis n. sp. No. 27251 Cayuca ranch Sierra Giganta mts. L. Cal. Oct 23 1930 A slender and open branched shrub or small tree, with twigs somewhat chestnut colored and very slender and very leafy. Leaves 3-6 inches long, with 3 4 pairs of pinnæ which are about 2 inches long. Leaflets' 15-20 pairs, narrowly oblong. barely aoute, about 6 mm. long by 2 mm. wide, appearing smooth but really very sparsely pubescent, venose, with about 6 large meshes on either side of the midrib. Pods 3 by 1 inches, elliptical-oblong, acutish and rounded at base and on a stipe 4-6 mm. long, reddish and thin.

Albizzia occidentalis of authors seems to be a Leucæna, it is a beautiful tree with tall trunk and widely spreading branches. I got it both at the Borrego ranch and on the Cape road to Todos Santos.

Climacorachis Hemsl. & Rose Cont. Nat. Herb. 8 43 1903 is not distinct enough from the pudica-pusilla section of Mimosa. I therefor propose the transfer of their names of species as follows. **Mimosa Mexicana (H. & R.)** C. Mexicana H. & R. **M. unijuga.** C. fruticosa H.& R. The body of the pod separates from the rim as in Mimosa. The annual forms of Æschynomene are altogether too close to Mimosa for comfort. That Mimosa Æschynomene, Acacia and Pithecollobium need a thorough overhauling goes without saying, but Rose was not the man to do it because of his sloppy generic ideas.

Mimosa Lagunensis n. sp. No. 27200. On the laguna, Laguna mts. L. Cal. Sept 22 1930. A rather widely branched shrub 4-6 ft. high, with hooked prickles. Leaves with 2 pinnæ and with each pinna having 5-10 obliquely oblong leaflets about 4 mm. long by 2 mm. wide, rather rigid, nervose, sharply apiculate, half-cordate below and with midrib not central, and with 5 nerves from the base on the upper side, setosely hairy especially on the margins, with the rachis and petiols short and very hairy. Heads few-flowered, on filiform peduncles 1-2 inches long. Pods short-stipitate, an inch by 4 mm. long and wide, of about 4 joints constricted ¼ the way to the suture and abruptly setose-acuminate, sparsely and very shortly aculeate and short-pubescent The very small leaflets and pods simulate Æschynomene.

Mimosa inequalis n. sp. No. 27267. Guadalajara, Mex. Nov. 26 1930. Annual, very widely branched, a foot high. Leaves sparse, of 2 pairs of leaflets which are obliquely obovate and rounded, with midrib not in the middle, thin, barely apiculate, green, strongly nerved, with 3 basal nerves above the midrib, setosely yellow-hairy as are the pods also, on petioles 1-2 inches long which are similarly hairy. Heads on stout peduncles. Pods ½ ¾ inch long, obliquely oblong, 4 mm. wide, shortly acuminate, flat, 3-seeded, with margins little if at all indented, many, in compact heads, body easily separating from the frame.

Mimosa Mazatlana n. sp. No. 224 J. Mazatlan, Mex. Nov. 20 1928. A prostrate annual, setosely hairy with yellow and appressed-pubescent hairs throughout, except the puberulent faces of the pods. Leaflets about 10 pairs, on 2 pinnæ, acutish, 4-6 mm. long, 2 mm. wide, collapsing easily, pinnæ 1-2 inches long. Stems with scattered and recurved prickles. Pods in heads, oval to oblong, not over 1 cm. long by 4 mm wide, 1-3 seeded with joints easily permitting separation of the sides. Collected there by Mrs Mexia, also from Uruguay.

Cassia absus L. N. 27191. La Barranca, Guadalajara, Nov. 23 1930. Perennial, 2 ft. long or more, subdecumbent, racemosely branched above. Leaves thin, 2-4 inches long, on filiform petioles 2-3 inches long, of 2 pairs of oval-obovate and rounded leaflets, all oblique, rounded and entire, an inch long, rather triple-nerved below, about sessile, smooth, paripinnate, the upper ones with axile flowers in the axils on pedicels filiform and 3 mm. long. Flowers yellow, 4-6 mm. long, with the calyx cleft almost to the base. Stems ending in pseudo-racemes 1-3 inches long which are glutinous-hispid-hairy. Pods perfectly flat, 4 mm. wide, an inch long, obliquely triangular, acute at both ends but not stipitate, vetch-like, 4-seeded, with flattened, oval-obovate seeds 3 mm. long and with about 10 faint lines of shallow pits, glistening-black. Valves opening along the dorsal suture and curling up as in Vicia but plants without tendrils.

Cassia tenuicaulis n. sp. In ditches at Guadalajara, Mex. Nov. 26 1930. A very slender perennial(?), 2-3 ft. high, widely branching from the base, the whole plant glutinous-hairy. Stems striate-angled. Leaflets 20-25 pairs, rigid, overlapping, linear, very sharply and obliquely acute, nearly smooth except on the margins, 3-nerved from the very base, 4-6 mm. long. Flowers in short racemes, very small and with large bracts. Pods an inch long, conspicuously constricted much as in Desmodium. Leaf rachis hispid with hairs pustulate at base.

Cassia stellata n. sp. No, 27196, Cacachilla mts. L. Cal., Oct. 2 1930 and at Triunfo, No. 27200, Oct. 7 An open-branched shrub about 6 ft. high, appearing as if yellow-glutinous throughout, but not at all glutinous, but densely yellow-stellate. Leaflets about 3 pairs(2-5), 1-2 inches long, lanceolate and shortly acuminate to elliptical and apiculate, rather oblique below, thickish and entire, with leaf rachis 1-2 inches long and about equaling the proper petiole. No glands. Flowers few, light-yellow, 8 mm. long, with dark-striped petals, on a pedicel about 1 cm. long. Pods 4 inches long by 4 mm. wide, nearly straight, manifestly constricted between the seeds both vertically and laterally, flattened, short-stipitate and apiculate, narrowly linear.

Cassia rotundifolia Rose ? No. 27192. Guadalajara, Nov. 26 1930. Annual, with the habit of prostrate forms of Hosackia but apparently in the bifolia group. Stems branching only at the base, slender, a foot long, shaggy with long and rigid and spreading hairs which extend often to the lower part and some leaves. Internodes mostly shorter than the leaflets. Leaflets 2, on the ends of stout petioles 2-3 mm. long, rounded obovate, not over an inch long, ascending, leathery. sessile, oblique at very base only, pinnate-veined. but upper side inclined to have 1-3 accessory veins at very base, not at all parallel-veined as in C. bifolia, entire, rounded to a little retuse at tip, conspicuously, closely, and finely veined, mostly smooth and shining. Stipules green about 1 cm. long obliquely triangular-ovate, acerose, parallel-veined, cordate below. Pedicels 1-1.5 inches long, becoming smooth, filiform, ascending, straight, often twin. Flowers shaggy below, 5 mm. long, yellow. Fruit about 1.5 inch long by 5 mm. wide, flat, linear, oblique at both ends, straight, many-seeded. Seeds flat rectangular, apiculate on one corner, smooth. Flowers in the upper axils. Frequent in old fields. A unique species which I had called C tenuivenosa, but Rose may have antedated me

Psoralea decipiens n. sp. No. 27178. La Barranca, Guadalajara, Mex. Nov. 23 1930. A prostrate and weak herb 1-2 ft. high, allied to P. pentaphylla, but leaflets acute and ovate and an inch long, rather venose, nearly smooth, 3, on a petiole fully 2 inches long. Flowers very small, in heads on long peduncles becoming a little racemose in fruit. Pods about 4 mm. long and ovate plus a long and hooked beak, growing in moist ground.

Psoralea Rafælensis n. sp. La Sal mts Utah, June 3 1914. Plant with the habit of P. mephitica, from a much branched and woody base. Leaflets cuneate-obovate, 1cm. long, 5, with a common petiole 3 cm. long. Leaves smooth except on the veins and a little pubescent below. Stems 6 inches high and many and much clustered in flat tufts. Flowers about 3, in an almost sessile cluster in the axils, about 4-6 mm. long. Calyx oblong, not inflated, 2 mm. long, lobes 1 mm. long.

Psoralea Rafaelensis var. magna n. var. San Rafæl Swell Utah May 11 1914. Same habit as the species, but leaves 1 inch long and fairly pubescent below. Flowers many in a dense head or short spike. Calyx inflated, 4 mm. long, the lobes over half the whole. The San Rafæl Swell is just on the west side of the Green river from the La Sal mts.

Dalea nummularia n. sp. A low shrub of the Johnsoni group, with few spines and warty stems. Flowers bright-purple, in dense and ovate spikes 1-2 inches long, spreading, with calyx densely hispid-hairy with yellow hairs, and with red glands, 5-ribbed, sessile, with long and subulate calyx lobes, and

early deciduous 3-cleft bracts, subacute or equaling the flowers. Fruits obliquely oval-ovate, half an inch long and mottled, with glands much as in D. Johnsoni. Leaves many, nearly sessile on a stout petiole with 6-20 pairs of oval to nearly round and ultimately rigid leaflets 4-6 mm. long and gradually reduced above Leaves 3-6 inches long. Green River Utah, May 28 1914 P. coll. No. 28257 and Willow Spr. Ariz., June 11 1899, Jones. Plants puberulent throughout

Astragalus Vaseyi Wat. I had never seen this growing till Apr. 2 1933. It seems confined to the Mexican border on the dry and sandy washes of the steep southern slopes of San Jacinto mt., in the Lower Temp. life zone, with Pinus monophylla. Watson describes it as a doubtful annual. It is clearly a biennial or winter-annual for the great mass of stems now making a mat on the ground could not have grown from seed since the snow melted. It has the same habit as A. Coquimbensis Reiche which antedates A. Thurberi Gray, in growing flat on the ground in great tufts from a single taproot. I have seen similar looking plants with the silvery leaves which I assumed were A. lentiginosus but may have been this species. The fruits are manifestly stipitate in some cases and flattened ventrally and are obliquely half-elliptical and with the suture straight nearly to the flat and incurved tip. The pods are about round in cross-section and conspicuously inflated.

Dalea Hutchinsoniæ n. sp. Pinos Altos mts. N. M. Sept. 23 1931, under pines, in open places. Weak annuals a few inches high, erect, with capillary stems and leaves which are smooth. Leaves above reduced to a naked rachis and always green and with scattered and depressed glands. Stems racemosely branched from the base, and ending in a short head or spike about half an inch long and on a capillary peduncle. Calyx long-white-pilose, 3-4 mm. long, with the subulate lobes as long as the tube. Tube with 5 dark-green very prominent and raised nerves. Flowers purple and rudimentary. Leaflets 1-2 pairs, an inch long .5 mm. wide. This seems to belong to the alopecuroides section. common in the forest at 7800 ft. alt. Named for Mrs Susan W. Hutchinson, a member of my party, specially interested in the genus.

Dalea Hutchinsoniae var. anomala n. var. Chiricahua mts., Ariz. in Rustlers' Park, Sept. 22 1931, 8000 ft, alt.

Plants a few inches high, very slender and widely branched and with single spikes about an inch long on the filiform peduncles.

Whole plant smooth except for the ciliate-margined lanceolate and green bracts, and subulate calyx lobes which arise from a deltoid base. Calyx conspicuously 5-ribbed with raised and black ribs 3 mm. long. Flowers minute, purple. Leaflets 2-3 pairs, linear-oblong and retuse members about 1 inch long by 2-3 mm wide. This connects with alopecuroides.

Dalea barrancæ n. sp. No. 27230, La Barranca, Nov. 23 1930. Slender annuals with filiform stems paniculately branching throughout. Leaves about 2 inches long, of 4 pairs of elliptical-linear leaflets narrowed below and sharply acuminate above, appressed-strigose, not over an inch long, mostly half an inch long and the petiole not longer than the lowest leaflet. Spikes termi-.5-1 inch long. dense, on a filiform peduncle 2-3 times as long. Flowers and bracts long-silky with hairs a little twisted and seemingly beaded and white. Calyx 5 mm. long and equaled by the green bract which is broad at base and long-acuminate. Calyx conspicuously 10-black-nerved, with the lobes a little longer than the tube and subulate. Petals purple, barely longer than the calyx. Common among weeds.

Dalea decipiens n. sp. No. 27229, La Barranca, Nov. 16 1930. A slender and erect shrub 3-5 ft. high, resembling D. uncifera but with absence of visible bracts and blunt leaflets, and flowers apparently small. Stems much-and alternately-branched above by slender and flexuous branches ending in slender-peduncled spikes, leafy below. Leaves 2-4 inches long, wide, with 4 pairs of leaflets which are white-hairy when young, and green above and smooth in age. Leaflets about 1 cm long, elliptical, barely apiculate, acutish below. Petioles about as long as the leaflets. Leaflets separated about 2-3 cm. Upper stems hoary. Spikes 1-3 inches long, the terminal one 2-3-times as long as the lateral ones, on peduncles an inch long, 4 mm. wide. Bracts rudimentary and deciduous. Flowers closely sessile in dense spikes Calyx chestnut-colored above, green and very pale, a little inflated, straight, with rudimentary teeth, hairy or nearly smooth. Pods about 3 cm. long, a little surpassing the calyx, about round but slightly flattened. Flowers absent but probably purple and small.

Tephrosia fruticosa n. sp. No. 27207, La Barranca, Nov. 17 1930. Strictly erect, 2-4 ft. high, rigid. Leaflets 3 inches long by an inch wide, acute and apiculate, very venose and with veins yellow-hairy, one pair with almost no rachis, finely pubescent all over. Flowers yellow and purple-veined, 1 cm. long, ascending in a dense spike 4 inches long. Calyx lobes long-acuminate and pilose. Bracts elliptical, nearly 1 cm. long, acute at both ends and narrowed below, very pilose and appressed and with many parallel nerves, pubescence of leaves velvety. stems branching above. This may be an Eriosema.

Tephrosia Lindheimeri Gray, No. 28552. East of Carriso Spring Tex. Apr. 27 1931. Plants growing flat on the ground in mats 4 ft. wide. Stems, petioles, rachis and petiolules densely yellow-hairy. Leaflets about 6 pairs, rather oval-obovate, 15 cm. long by 4 cm. wide, leathery, smooth above and venose, pilose on

the nerves below, appearing as if albomarginate because of the pubescence extending a little beyond the margins below, rounded, entire, obscurely apiculate, with rachis strongly angled. Flowers purple, about 1 cm. long, scattered on the floral rachis for 6 inches in length. Pods absent. Leaves many, 6 inches long. On prairies.

Cracca collina Jones seems to be Eriosema multiflorum Rob.

Cracca pumila (Rose) ? C. N. H. 10 99 1906 as Benthamantha. Nn. 27240, Primiera, Sierra Giganta mts., 27239 Cayuca Ranch same loc. Oct. 26 1930. Very slender and erect herbs 2 ft. high, racemosely branched above. Stipules 1 cm. long, setaceous. Leaflets about 19, broadly elliptical, 1 cm. long, apiculate, softly and sparsely pubescent with spreading hairs. Leaves 4-6 inches long. Pods about 3 inches long and 2 mm. wide, smooth, or ashy when young, straight. Plants shrubby below. I do not adhere to the dictum of "Once a synonym always a synonym".

Jepsonian Astragali. (See Manual pp.)

A. deserticolus, an impossible name is probably nutans Jones.

A. Preussii var. limatus is Crotalariæ Bth.

A. Kernensis is lentiginosus Dougl.

A. inflexus var. leucolobus (Jones) is a ludicrous blunder, for the plant is nearer the Purshii group.

A. atratus var Panamintensis (Sheldon) shows ignorance of atratus which is quite a different species.

A. agninus is aridus a variable species as to development of septum

A. Clarianus is one of the forms of the variable A. tener, which probably includes A. Rattani.

Jepson's figure of A. acutirostris Watson which is A. streptopus Greene does not show the oxytropidoid keel rightly nor the twisted pedicel, the cause of Greene's name.

Astragalus Mexiæ n. sp. No. 2563, Mexia from the rancho Colorado, Chihuahua, district of Guerrero Mex., May 27 1929 2200 meters alt. on sides of steep and dry ravines, in dry red gravelly soil. Prostrate perennials from a strong taproot. Plant related to A. parvus, but flowers not in heads. Stems many from the crown and racemosely branched throughout and with short and congested internodes, the whole about 6 inches high, with very many thin and delicate leaves about as long as their subtended racemes, appearing green. but minutely woolly with very short and appressed hairs. Leaves 2-3 inches long and with short and filiform petiole .5-1 inch long. Leaflets elliptical, about 6 mm. long, rounded at tip, 4-7 pairs, petiolulate, slightly more pubescent below, with stipules adnate to petiole and obliquely-triangular-acute and 2-3 mm. long and green. Racemes mostly

hroughout the plant and nearly sessile, 1-2 inches long, broad, with about 10 flowers subtended by relatively, large, green but ciliate bracts. Calyx white, loosely inclosing the floral parts as if inflated, obliquely cylindrical from a triangular base which has 1-2 bractlets at the oblique insertion, the tube a little arcuate because the lower side is concave and upper much arched, about 4 mm. long by 2-3 mm. wide and laterally flattened, the subulate teeth lax and about 2 mm. long. Banner narrow and much arched and with reflexed sides. Wings straight, narrow and a little longer than the keel.and often purple-tinged at tip. Keel very blunt and purple-tipped. Pods as ashy-puberulent as the leaves, slightly arched and shortly acute, about 2 mm. high and 6-8 mm. long, deltoid in cross-section and deeply sulcate dorsally to the middle, and with a complete hyaline partition to the ventral suture which is raised exter ially as a strong rib, smooth, sessile. Whole plant a mass of flowers. Named for Mrs. Mexia the collector.

Astragalus Coquimbensis (H. & A.) ReicheVol. 2 p 109 Fl. Chil. seems to be the same as A. Thurberi Gray and antedates it.
A. candidissimus Ledebour is not the same as Watson's synonym which fact justified Greer e's A. Miguelensis.
A. Crotalariæ Bth., A. limatus Sheldon was described as from Monterey by Coulter and led to much confusion by Gray, but it could not have come from there.
Hamosa manca Rydberg is A Austinæ Gray as shown by the connate stipules.

Xylophacos lagopina Rydberg seems to be A. Pulsiferæ Gray A. Breweri Gray and filicaulis F. & M. are related,but not identical.

A Laxmanni Jacq. has been assumed to be the same as adsurgens Pall. and our nitidus but this cannot be for the pubecence is not fixed by the middle as in nitidus,

A. Mauretanicus Stev. and Parryi Gray seem related.

A. Mexicanus A. DC. seems to hold up on the calyx being inclined to be inflated and 6 mm. long, with deltoid teeth about 1 mm. long, and the tube being white-short-shaggy with hairs inclined to be felted, banner broad.

A. obcordatus is to be compared with A. distortus, but it has no sign of a septum as is shown by distortus at times, This group the Sparsiflori should come either near the Hamosi or distortus put in the Hamosi.

Hamosus Minthorniæ Rydberg is A. Congdoni Watson, probably, but the locality of collection very doubtful.

A. curtipes Gray is a very doubtful species of the Monterey, Cal. region, going up as far as San Francisco, and belongs in the puzzling leucopsis group and may be the same as A. Franciscanus Sheldon, a freak of leucopsis with connate stipules.

Allium hæmatochiton Watson was rightly named "bloody coat" from 'aimatos' bloody and "chiton" coat because of the lower scales being blood-red. The extra propagation is by the bulbs splitting vertically through the middle.

Phaseolus barrancæ n. sp. No. 27177, La Barranca, Guadalajara, Nov. 21 1930. Climbing high over bushes and robust, in rich soil. General appearance of Perytheuloma. Leaflets broadly elliptical to elliptical-ovate, 2-3 inches long by 1.5 wide, very venose below, velvety all over, entire, apiculately acuminate, half-cordate into a stout petiole 2-3 mm. long. Flowers an inch long. deep-purple and striate-veined, 3-5, in a short and short-peduncled raceme. Pods linear, much arcuate, immature, 2 inches long by 4 mm. wide, densely yellow-velvety, apiculate.

Desmodium validity does not seem much discussed for it was assumed to be antedated by Meibomia Adanson Fam. but no species were described in it till after Desmodium was proposed, and so the genus falls. Pleurolobia also antedated it but its type is an Æschynomene, which differs from Mimosa in the slim character of a partition between the joints of the pods, and now Hemsley and Rose come along and complicate things with Climacorachis.

Æschynomene Guadalajarana n. sp No. 27212, La Barranca, Guadalajara, Nov. 12 1930 and also No 23052, La Barranca Nayarit 1928 A slender and erect shrub 4-6 ft. high with the thick stems very slender and racemosely branched, above with widely spreading branches and very slender racemes about a foot long. sparsely and minutely pubescent. Leaves odd-pinnate, 4-6 inches long, of about 30 pairs of narrowly-oblong, rigid leaflets 1 cm. long and venose and 2 mm. wide, obliquely-cordate at base, obtuse, but needle-pointed or awned, with midrib in the center Flowers in narrow and compound racemes, and with minute bracts Calyx pubescent, 2 mm. long and flowers 6 mm. long and purple and with smooth banner. Pods on a filiform stipe twice as long as calyx, joints 1-2, almost distinct, obliquely oval, each about 4 mm. long, smooth, venose, apiculate. Petals and floral rachis densely and minutely pubescent.

Erythrina flabelliformis Stdl. Standley does not describe the coral-colored seeds correctly.

Lonchocarpus capensis n. sp. No. 27259, San Jose del Cabo. Sept 14 1930. A big tree. Flowers in a raceme a foot long, lax, 1-1.5 cm. long. Leaflets straight but oblique at base on the lower side and inserted on the lower corner, blunt, apiculate, with an extra basal nerve on the upper side, smooth. pedicels 1-1.5 inches long. Calyx lobes 2-4, deciduous, oval, 5 mm. long, purple. Petals longer, purple. Pods fleshy, constricted mostly in two parts, 2-3-seeded, 2-3 inches long, somewhat flattened, stipitate and long-acuminate, hoary, 1 cm. wide. Petals strongly red-veined.

Peganum Texanum n. sp. Del Rio Tex. A low and prostrate herb a few inches long, and much branched from a woody base and with short internodes. Leaves ovate in outline and once to twice-pinnately divided into linear, acute and revolute margined segments, puberulent. Pedicels slender recurved, .5 inch long. Flowers yellow. Sepals about 7, linear-filiform and about .5 inch long, entire. Pods didymous, about .5 inch wide membranous, filled with the few, large, and cellular seeds, the 2' divisions of the pod seldom equal. This grows also at Eagle Pass and eastward in loose soil.

Helietta barrancæ n. sp. No. 27091, La Barranca, Guadalajara. Nov 19 1930. A slender shrub, 6-8 ft. high, openly and slenderly and alternately branched, growing in rocky places Leaves thin, 3-foliolate, low-crenulate-toothed, with terminal leaflet nearly twice as long as the rest, lanceolate from a cuneate base and on a petiolule 6 mm. long, the lateral leaflets oblique and nearly sessile. Flowers minute, in a compound raceme, purplish. Fruit normally a single obliquely winged carpel, though sometimes twin, 1 cm. long by 3-4 mm. wide, rounded and very flat, parallel-veined.

Phyllanthus peninsularis Brandg. No. 27542, Laguna mts. Sept 22 1930. The seeds are sharply triquetrous and with raised and chocolate colored and zigzagg cross-markings.

Phyllanthus Galeottianus Baill., 27494, Loreto, Oct 14 1930 This has nearly round and glossy-green leaves. Anthers dehiscing parallel to midrib. Flowers yellowish-green. It is quite distinct from peninsularis

Phyllanthus viridis n. sp. No. 27503. Cacachilla mts. Oct. 2, 1930. A rigidly branched shrub 4-6 ft. high, with branches widely spreading, dark-gray, smooth, and the secondary ones almost spinose,, with alternate, oval, entire, thin, green leaves, smooth, rounded at tip and inclined to be cuneate at base, and on filiform petioles $\frac{1}{3}$ the length of blade. Stipules triangular-subulate and red. Most of the branchlets aborted into warts having fascicles of slightly larger leaves. Flowers mostly single, on rather stout and half-inch peduncles. Pods smooth, about 7 mm. wide, depressed-globoss. Seeds chocolate colored, smooth and shining, lenticular, rounded on the back and flattened on the other side, without markings, about 4 mm. by 3 mm., rounded at the ends and a little narrower below.

Croton attenuatus n. sp. No. 27500, Cayuca ranch, Sierra Gigania, Oct. 23 1930. A very slender and widely branched shrub several feet high, with smooth and gray bark. Leaves scattered, 1-2 inches long, mostly rhomboidal-ovate with a cuneate base, and at least the upper ones abruptly long-acuminate, some of the lower ones triangular-acute at both ends, on a white-pubescent petiole .5 inch long. without evident stipules and glands, surface

sparingly stellate-pubescent. Leaves quite thin. Fruit terminal, of a single short staminate spike an inch long, with a few pistillate flowers at base. Pods 7 mm. high, depressed-globose, closely and finely stellate-pubescent. Seeds olive-colored. 4 mm. by 5 mm., oval, a little flattened on one side and rounded on the other, rather truncate below.

Croton crenulatus n. sp. No. 27499, Cayuca ranch, Sierra Giganta, Oct. 23 1930. A moderately stout and erect shrub with short branches, and smooth and gray bark, the young twigs yellowish-white with dense and pseudo-stellate hairs Leaves thickish, nearly oval, rounded to subcordate below, inclined to be a little triangular at tip but barely ever acute, crenulate throughout, rather densely puberulent below with soft hairs from a raised base in radiating clusters of 5-10 as if stellate but not really so. Pods rounded, densely puberulent, 12 mm. wide by 10 mm. high, mostly single and mostly sessile at the ends of the branches, the plants apparently dioecious. Seeds dark-colored, 7 mm. by 8 mm. and 6 mm. thick, about oval, but a little truncate below, ridged on the back some and sulcate on the face and a little flattened there. The Crotons of the Peninsula do not seem to fit anywhere but are sui generis.

Croton Alvaradonis n. sp. No. 27827. Trail down the Lagunas, Sept. 24 1930, Named for my guide, Alvarado, a grand old man. An openly branched shrub, with leaves clustered at the ends of the twigs racemosely. Leaves about 2 inches long, elliptical-lanceolate, acutish, inclined to be cuneate below, very strongly 3-nerved and with them ·a sed below, finely spinulose serrate with the teeth ending in a cluster of hairs, felted-pubescent throughout, but with the upper surface dark, on stout petioles barely 1 cm. long. Fruits oblately globose or sub-didymous, finely and shortly felted and smooth, $\frac{3}{4}$ inch by $\frac{1}{2}$ inch thick, single, with the very large seeds single in each cell and pictorially blotched and smooth.

Croton Boregensis n. sp. No. 27496, Borego ranch, Laguna mts, Sept. 20 1930. Allied to C. Magdalenæ Millsp., A shrub, 6-8 ft. high, openly branched and erect, growing in the shade of live oaks. Stems white-stellate-hoary, as are the petioles which are about an inch long. Leaves thin, cordate to cordate-ovate-triangular, shortly acuminate, obscurely and remotely dentate, softly pubescent, particularly below, with stellate and rather sparse hairs with the central hair elongated and with several very short ones at base. Leaves 3-4 inches wide by 4-6 long. Inflorescence terminal and with a long and linear staminate spike with 1 to few fertile flowers at base. Fruits globose, shaggy-hairy, about half an inch long. Seeds shining and inclined to be mottled along the center of the back, rounded at both ends, somewhat flattened, 8 by 4 mm., grayish.

Croton Blasianus n. sp. No. 23304, San Blas Sinaloa Jan 25 1927. A straggling shrub with smooth and nearly black branches, having many very short laterals about an inch long, and with several leaves nearly sessile and elliptical to lancolate and shortly acuminate, minutely serrulate, and with soft pubescence on both sides but appearing green, venose, 2-3 inches long. Pubescence equally stellate and short. Inflorescence a spike hardly an inch long and few-flowered. Fruits 1-2, spherical, 5 mm. long and vary shortly felted-hairy. Seeds as in C. Boregensis.

Tragia scandens n. sp. No. 23300 Guaymas, Sonora, Jan. 26 1927. I refer here also Purpus' no. 419 Ixmiquelson Mx. and Brandegee's no. 110760 from the Cape, and also Purpus's no. 110800 from Calmalli L. Cal. all in Cal. herb. Plants filiform climbers with ovate leaves barely acute and coarsely dentate, with cordate base, on a petiole 1 cm. long. Raceme short and filiform.

Bernardia Mazatlana n. sp. No. 22626, Mazatlan Nov. 20 1930, on hillsides among rocks. Herbaceous but stems a little woody below, about a foot high, spreading and much branched. Pistillate spikes terminal, oblong, .5-1 inch long, silvery-hairy, shortly and stoutly peduncled. Calyx lobes filiform. Staminate clusters narrowly linear and about an inch long, on filiform peluncles nearly as long, and opposite the leaves and below the pistillate ones. Leaves thin, broadly ovate from a truncate to subcordate base, an inch long, finely serrulate, low-veined and on a filiform petiole 1 cm. long.

It is remarkable that Standley omits all mention of seed markings in Euphorbia, crucial characters in some cases, in his Mexican woody flora.

Sebastiania sarmentosa n. sp. No- 27544. Primiera Agua, Sierra Giganta, Oct.15 1930 and near Loreto no. 27545

Erect and racemosely branched herbs with rather woody base and about 3 ft. high and fleshy leaved. Leaves alternate, many, elliptical-lanceolate and shortly acuminate at both ends, triple-nerved, crenulate to barely serrate with uncinate tips. Whole plant smooth. Leaves 2-4 inches long. Flowers in axillary clusters about an inch long, small, red, with ovate bracts and with a stngle pistillate and pediceled flower below. Pistillate sepals triangular-acuminate and erose. Pods smooth, depressed, about 7 mm. wide, 3-celled. Seeds single in each cell, about 4 mm. long, globose-ovate and acutish at tip but rather cordate below, round in cross-section, obscurely rugose and roughened all over, chocolate-colored, about the shape and general appearance of Euphorbia heterophylla.

This is allied to S. bilocularis as understood by Brandegee, but the leaves are narrower and acute and the pods only about half the size and seeds very different. I do not consider the bilocular pod as significant for Tetracoccus and Jatropha vary in the same way.

Cuphea Watsoni n. sp. No. 4616 Pringle, Tequila, Jalisco, Mex., Sept 1893, Herb. Univ. Cal. No. 108086. A tall and erect plant 2-3 ft high, alternately and widely branched and slender annual, with long internodes. Stems, upper leaves, and inflorescence low-shaggy with abruptly spreading and glandular hairs. Leaves truncate-ovate to cordate-ovate, 1-2 inches long, on a stout petiole 1 mm. long, conspicuously feather-veined below and rather abruptly acuminate, very obscurely denticulate: upper ones somewhat reduced and lanceolate. Calyx 15 mm. long by 2-3 mm. wide and lanceolate, on a pedicel 2 mm. long. Upper petals exserted on a short claw and with blade about round and 4 6 mm. long, pink-purple. Flowers racemose and few. Other petals oblanceolate to linear and 4 mm. long. Growing in fields as do the other species.

Euphorbia corallifera n. sp. No. 27545, Cayuca ranch, Sierra Giganta, Oct. 23 1930. This belongs to the Poinsettia group, apparently near E. tricolor Greenman. A slender and erect shrub, Ephedra-like, widely branching. and with long and green leafless stems with internodes 2-3 inches long, and with a joint or two at tip with a pair of glaucous and rather leathery leaves about an inch long, and with oval to oval-rhomboidal flat leaves, entire and shortly acute at base and often at tip, on filiform petioles half their length. Leaves smooth above and only minutely puberulent below. Stipules rudimentary. Flowers in a very short cyme arising from the terminal pair of leaves, shortly pubescent throughout even to the rudimentary bracts which are a little lacerate. Glands round, red, prominent. Appendages ovate to rhomboidal, a little crose above, white or tinged with purple, nearly half an inch long, spreading. Pods depressed-spherical smooth, green, about quarter inch long, immature. Inflore scence sometimes compound. This is a very showy bush 6-8 ft. high.

Euphorbia Espirituensis n. sp. No. 27505, Espiritu Santo island near La Paz, Sept 29 1930 A straggling and very widely branched shrub with the lateral branches trailing, a few ft. high and intricately branched with long and very knotty twigs many abortive ones half an inch apart bearing little clusters of 2 or more rudimentary leaves which are 4-5 mm. long and about oval though a little oblique below and rounded above, thick, entire and smooth, on stout petioles half as long, and with conspicuon deltoid and red stipules. Flowers solitary, smooth, yellowish, small. Pods smooth. Seeds oval-ovate, acutish, slightly angled gray, smooth, with a trace of sculpturing on the sides. the shape and size nearly that of Preslii.

This might pass for Magdalenæ but appears to be a fair insular species.

Orobanche. In a recent brochure on this genus a European author, in commenting on my specimens in herbaria gives my name as E. J. Marcus though my labels are all printed with name in full so that there can be no excuse for error. How any careful man could make such a blunder is hard to believe unless he copied from some address-book, where it was given as "Jones, Marcus E" but even then, not excusable.

Herpestis macrantha n. sp. No. 43627, P. Coll. Herb., Colonia Juarez Chihuahua, Jones, Sept. 12 1903, 6000 ft alt in ditches by roadside. A creeping and rooting perennial with prostrate to ascending stems, acutely angled and a few inches high, smooth, with internodes shorter than the leaves. Leaves punctate and lanceolate and tapering into very short petioles, not auricled nor clasping, sparsely low-serrate above, about an inch long, little reduced above. Pedicels single in the upper axils, filiform, about an inch long, mostly slightly longer than the leaves. Calyx 6 mm long in flower and 8 mm. in fruit, the two outer lobes oblong-ovate-acuminate, the others narrower and a little shorter. Corolla yellowish at least below and purple-tinged above, broad, a half longer than the calyx, with lobes flaring. Pods oblong-ovate equaling the calyx lobes, shortly acute. Seeds black, oval, faveolate.

Galvesia sessilis n. sp. No. 27410 La Barranca, Guadalajara, Nov. 21 1920. An erect and rathor shrubby plant, growing in rich slopes, 3-4 ft. high, cymosely branched above into long, linear, and dense short-leafy-bracted spikes a foot or two long and shortly and densely glandular-pubescent throughout even to the flowers. Leaves opposite throughout even to the uppermost floral bracts, sessile, almost clasping. oblong-ovate, shortly-acute, coarseiy serrate, 2-3 inches long by half as wide, venose, thick. lower floral bracts 1 cm. long, smaller above, sharply serrate, ovate and persistent. Calyx 6 mm. long, teeth deltoid, nearly half the whole, green. Flowers red, almost sessile,(pedicels 1-2 mm. long) ascending, 2 inches long by 5 mm. wide, split $\frac{1}{3}$ the way down, with the lower lobes a little flaring, slightly wider above. Filaments of the two long stamens wider above and densely bearded on one side, the other stamens abortive and filaments shorter. Pods oval-ovate, 8 mm. long, black, abruptly and sharply acuminate, not oblique, filled with the oblong seeds which are truncate at both ends, 1 mm. long and a little wider above and with a conspicuous honeycomb coat with the cells in longitudinal lines going clear through the coat which is about as thick as the seed itself. Seed character quite different from the other species and from Castilleïa.

The following Salvias were submitted to Prof. Carl Epling of Univ. Cal. Los Angeles branch who has specialized on the Labitæ but who follows the Vienna code, as I do not.

Salvia–Calosphace. —PURPUREÆ.

Salvia Marci Epling n. sp. No. 27298. Arroyo Undo rancho prope Loreto, Baha Cal. e Jones lecta constituta est; typum in herb. Univ. Calif. (Los Angeles) vidi. Frutex pulcher amabilis, ramis incano-tomentellis, internodiis 2-4 cm. longis; foliorum habitu Monardæ mollis, laminis 8-10 cm. longis late lanceolatis ad apices acutissimos gradatim angustatis in basi rotundatis, marginibus serratis, pagina superiore viride inferiore pulchra incana ambobus præsertim inferiore mollissime tomentellis, petiolis 1-2 cm. longis, elatis; floribus 6-12, in verticillastris approximatis dispositis; calycibus florentibus 8-9 mm. longis extus incano-tomentellis labiis obtusis brevibus in maturitate non visis: corollarum purpurearum tubo 18-20 mm. longo ad basem valde abrupte angustato invaginato, labia inferiore quam superiore galeoto breviore: staminibus in galea inclusis. Nov. 26 1930. Etiam Diguet, sine loco

GLAREOSÆ.

Salvia emaciata Epling **n. sp.** No. 744 Hartman. Chihuahua in locis humidis prope Pilares lecta constituta est; typum in herb. Univ. Cal. (Berkeley). Isotypos in herb. Kew et Gray vidi. Herba annua. gracilis, tenella, altitudine ad 35 cm. utrimque fere glabra tenuissime hirtella, ramis erecto-ascendentibus, internodiis 3-6 cm. longis: foliorum laminis oblongis 2-3 cm. longis, 5-8 cm. latis, obtusis, in basi ad petiolos 5-10 mm. longos angustatis: floribus sæpius solitariis rarioribus binis in verticillastris bracteis perstatis 3-6 mm. longis elliptico-laneeolatis ciliatis subtentis, glomerulis inter se 1.5-3 cm. distantibus; calycibus florentibus 8-9mm. longis, in maturitate paulo auctis; corollarum tubo 5-5.5 mm. longo, labia spperiore subfalcata, 4-5-5 mm. alta inferiore 6-7 mm. longa, lacinia media cordata. Inter Rio Chico et Rio Cabello, Sierra Madre Sept 29 1911 Barlow, Soldier Canon Sierra Madre 6500 ft. alt. Sept 16 1903 Jones et Colonia Juarez Jones.

EUSIGMOIDEÆ.

Salvia palmæ Epl n. sp. No. 380 Jones, prope La Palma Jalisco Mex. lecta constituta est typum in herb Coll. Pomona, isotypum in herb. Smithson. vidi. Herba innocua altitudine 40-60 cm., caulibus e caudice lignoso ascendentibus sparse pubescentibus vel cum pilis extensis glandulosis conspersis: internodis irediis 3-8 cm. longis: foliorum laminis 2.5-4 cm longis, 18-25 mm. latis, ovatis, in apice obtusis, in basi rotundatis, petiolis 3-6 mm. longis elatis, margine irregulariter crenato-serrata, paginis ambobus hirtellis: floribus3-6 in verticlllastris bracteis caducis parvis subtentis, glomerulis inter se 1–4 cm. distantibus in spicis interruptis 20–40 cm. longis, gracilibus, laxis, dispositis: calycibus florentibus 5.5–6 cm longis, extus hispidulis, in matnritate 8 mm. longis; corolla-

rum 6 mm. longo; labia superiore 3 mm. alta, inferiore 8-9 mm. diam.

MEMBRANACEÆ (ESCHOLTZOIDEÆ).

Salvia verecunda .n sp. Epling In montibus Sierræ Madris Mex. in canone Guavnopæ lecta constituta est; typum in herb. Coll. Pomona vidi. Herba perenne, parva, verecunda; caulibus ascendentibus, 20-30 cm. altis, hirtellis, foliorum laminis deltoideo-ovatis, 2-4 cm. longis, 1.5-2.5 cm. altis, in apice acutis, in basi subtruncatis: petiolis .5-1 5 cm. longis, elatis, margine crenato-serrata, paginis ambobus viridis et hirtellis; glomerulis inter se 1-3 cm. distantibus, bracteis viridibus ciliatis subtentis; calycibus florentibus 6 mm. longis extus ad basim minute glandulosis et pilis longioribus, setaceis, sparsisssme conspersis in maturitate fere glabris paulo auctis: corollarum tubo 4 mm. longo, intus nudo, labia superiore 2.5 mm. alta, inferiore 5.5 mm. longo.

Hyptis decipiens n. sp. No. 27299, Triunfo L. Cal. Oct 6 1930. Allied to H. laniflora, erect shrubs 3-6 ft. high. with stems ending in open panicles. Whole plant appearing smooth except the white woolly panicles, but leaves puberulent on the raised nerves below, and roughened on the upper side with minute hairs. The pubescence throughout consists of rather long-stalked hairs branching at tip into a stellate-appearing mass, but really the branches are alternate. The pubescence of the panicles is densely-white, very close, and not woolly, all the parts from calyx to peduncles about equally white. Leaves ovate to lanceolate, cuneate into the petiole, 1 cm. long, mostly acuminate at tip, obtusely crenulate, reduced above, those of the panicles about an inch long and elliptical. Panicles a foot or two long, open, of many ascending branches with regular pairs of clusters, each on a peduncle .5-1 inch long. Clusters umbellate, of about 25 flowers on short pedicels about as long as the 3 mm.-long calyx and with filiform lobes half the whole. Corolla not over 5 mm. long, purple.

Sphacele hastata Gaay. Ivan Johnston in his flora of the Revil. lagigedo islands speaks of the vile smell of the plant. I can say that it was infested with a cloud of hummingbirds all dry in the Lagunas and that I did not observe any bad odor. It covered an acre there and was apparently at home. I also saw it on the trail in 1928 on the east side of the range. It may have been introduced.

Micromeria Brownei var pilosiuscula Gray of Texas has oblong-ovate nutlets, 2 mm. long and rather triquetrous with rounded back and conspicuously white-mottled.

Lippia barbata Brandg. This species requires a better description than the one given. My specimens from the Cayuca ranch in the Sierra Giganta form an openly branched shrub 4-6 ft. high, with gray bark, and leaves clustered at the ends of short branches. Whole plant very rough-pubescent throughout even to the small flowers. Hairs appressed from a pustulate base. Leaves thick and leathery, raised-pinnate-veined, 2-3 inches long, ovate to lanceolate-ovate, acute, low-and bluntly-crenate, very shortly-cuneate into the very short petiole, nearly equally pubescent on both sides rarely oval-ovate and obtusish. Flowers apparently diœcious, white, the fertile ones in dense and ovate heads(at first) about an inch long and as long as the peduncles, the flowers themselves being barely as long as the ovate and overlapping, green and obtuse bracts, 8 mm. long and rather densely short-pubescent. The whole floral cluster is not exserted beyond the leaves. At maturity the 5-nerved bracts disarticulate about 1 mm. above the rachis and fall off, the stout pedicels are articulated to the top and cup-shaped and about 1 mm. long and remain on the rachis which is about as long as the peduncle. Heads single in the axils. The fruits are globose and about 2 mm. long and conspicuously white-hairy, the hairs spreading in all directions and as long as the body Staminate flowers in open and inconspicuous greenish clusters, with the oblong bracts half as long and about as long as the proper tube of the flowers. Flowers funnelform on the upper half and with spreading and rounded lobes.

Enphorbia multifoliosa .n sp. No. 27517, La Barranca, Guadalajara, Nov. 17 1930. Plant apparently allied to E. pycnanthema Eng. Prostrate annuals, forming dense plaques. Internodes short, but little longer than the leaves below, but with leaves overlapping above and particularly so on the branches where they are much shorter and smaller. Normal leaves about an inch long by half as wide, rather thickish, palmately 4-nerved, barely serrulate above, conspicuously oblique below, sparsely short-woolly-hairy and becoming smoothish with age, grayish, with a minute petiole as woolly-hairy as the stems. Flowers red, a solid mass backed by smaller leaves, and with each flower sessile in the axil of a bract about its own length. Appendages red and fimbriate on the margins and with the lower pair elongated so that the flower seems horseshoe-shaped. Pods densely woolly, barely exserted, small. Seeds 1 mm. long, oblong-ovate, acutish and a little oblique, rather acutely 4-angled with flattish (not grooved) sides, and conspicuonsly 4-6-ribbed with broad cross-ribs and filiform grooves between, not punctate nor warty, with angles a little notched. The plants remind one of pilulifera, but seeds different.

Euphorbia bilobata Eng. has warty seeds in all forms

Enphorbia longepetiolata .n sp. No. 27514a, La Barranca, Guadalajara, Nov. 12 1930 and same loc. No. 27538 Annuals, erect and widely branched, with long internodes and deepl y sulcate branches. Leaves opposite, 2-3 inches long, very thin, 1-nerved, entire, elliptical-lanceolate-acuminate, the blades 1-2 inches long, with petiole half as long and filiform. Flowers few, in the axils, white, petaloid appendages minute. Pods smooth and glaucous. Seeds about 1 mm. long, about oval, with 3 lines of transverse and quadrangular pits, black or olive-colored, acutish. waste places in fields. This is also like E. Francoana Boiss. but inflorescence different. E. graminifolia is similar.

Euphorbia tenuissima n. sp. No. 27514, La Barranca, Guadalajara, Nov. 25 1930. Allied to E. subreniformis W but leave oval to rhomboidal-ovate, very thin, opposite, pennate-nerved, entire, smooth, on capillary petioles, the lower ones about an inch long and the upper ones 1-2 mm. long. Flowers single in the upper axils, greenish, very small, with veay short and whitish appendages entire and rounded, and with the bracts never acute but always small. Pods sharply acute. Seeds oblong and rounded at both ends, and a little flattened, but rounded on the co ne rs, and shallow-pitted in vertical lines, not angled. A weak and erect and almost capillary annual, easily mistaken for subre niformis. About a foot high and openly branched, Seeds pectinately warty and pitted.

Many species at times have the stamens exserted and anthers didymous, with each lobe about spherical.

Euphorbia pseudoserpyllifolia Millsp. seems to be perennial At least all my speimens are slightly shrubby below. The seeds are narrowly oblong, acutish, reddish, deeply grooved longitudinally and without cross-wrinkles or warts. There is a large group of species with similar grooves.

Croton Lagunensis n. sp. No. 27827, Trail down the Lagunas, Sept 24 1930. An openly b ranched shrub about 6 ft high, with gray bark, much branched and with short and leafy branches. Leaves 2-3 inches long, thick, elliptical, sharply low-serrate as if glandular, and with teeth having a tuft of hairs at the ends, a trifle more acute at tip than base, densely white-stellate below and appearing as if greener above, but yellowish and with pubescence more compact, pinnate-nerved though the basal pair of nerves a little more prominent, on a stout potiole 1 cm. long. Fruits on stout pedicels 1-2 cm. long, mostly single and terminal, 12-15 mm. wide, densely white-stellate, always 2-celled and didymous, the two halves are 8 mm. wtde and would be spheres except for the flat commissure. The pods have a double ridge down the sides to the middle through which they split and continue to the base. The seeds are gray, mottled, and conform

to the external shape of the pods and are ½ mm. shorter than the cells. This has the habit of C. Magdalenæ Millsp. but grows at higher elevations in the same life zone.

Jatropha spathulata Muell Arg. seems to have two marked forms, one with globose pods is rare, the other has didymous pods and spherical seeds half as long as the usual form. I do not consider the var. sessiliflora M. A. as valid. My no. 27506 from the Cape with knotted stems is the common form. No. 27504 from the Borego ranch is less knotted and with longer leaves. No. 27707 from Triunfo is not knotted. There are constantly forms with only 2-celled pods that are confusing.

Jatropha decipiens n. sp. No. 27828, La Barranca Guadalajara, Nov. 25 1930. A tall bush 6-8 ft. high, with long and slender branches and short panicles in the upper axils. Leaves 4-5 inches long, smooth, entire, elliptical, shortly cuneate below into a stout petiole 1 cm. long, abruptly triangular-acuminate at tip, thin, feather-veined, opposite. Fruits fleshy, yellow 1-1.5 cm. wide and 1 cm. long, either globose and single seeded or 2-celled and somewhat didymous. Seeds either spherical or conspicuously flattened on the commissural side. Inflorescence a cluster of racemes from a very short common base.

Buddleia corrugata n. sp. Gc. 27361, Arroyo Undo, Sierra Giganta, Oct. 26 1930. A slender and openly branched shrub a few feet high, with dark bark and white-woolly-stellate twigs and leaves. Leaves 1-2 inches long, reticulate below, deltoid-cuneate below into a very short petiole, coarsely and strongly few-toothed very obtuse, oblong-ovate, in about 3-4 pairs on the short season's twigs. Flowers few, in small and sessile heads arranged racemosely at the ends. Heads 20-23. Flowers very small.

Loranthus anomalus n. sp. No. 27330, La Barranca, Guadalajara, Nov. 17 1930. An olive-green shrub 2-3 ft long, with woody stems and filiform branches, with scattered, smooth, and entire leaves, 2-3 inches long, shortly acuminate at both ends and on slender petioles 1 cm. long, leathery but becoming thin. Flowers diverse. The lower ones in racemes and on pedicels about 4 mm. long; the others in catkins an inch or less long which are racemose on the main rachis. All flowers seemingly fertile.

Mortonia aspera n sp. No. 27502, Arroyo Undo, Sierra Giganta, Oct. 26 1930. A rigidly branched but not spinose shrub 4-6 ft. high, with dark brown bark becoming grayish-striate on the pubescent twigs. Leaves alternate and inclined to be fascicled on low warts, about an inch long, nearly oval but with short and very pubescent petiole. Leaves yellowish, thick, 3-nerved, entire

but seemingly inclined to be wavy on the margins, very much rounded at tip and rarely a little retuse, minutely papillose with clusters of raised and shining cells which become elongated and concentric in the center surrounding a stout, erect, and tapering hair. Fruits yellowish to orange-colored, fascicled on the warts oval, apiculate from the stout remains of the 2-lobed stigma, a little sulcate between the seeds, 2-celled, 2-seeded, indehiscent, purulent, on stout pedicels their own length, spreading, 7 mm. long by 4 mm wide, a little flattened at the sutures. This would pass for Colubrina glabra Wat. which is a very variable species but the fruit and pubescence are different.

Dodonæa Lagunensis n. sp. No. 21087. The Laguna Laguna mts., Sept 24 1930. A slender shrub 6-8 ft. high. Leaves oblong-lanceolate, apiculate, entire, 3 inches long, nearly an inch wide, finely feather-veined, tapering into a short and margined petiole 6 mm. long, shining and appearing as if waxy, very minutely pubescent, clustered at the ends of the branches. Clusters of fruit almost sessile. Peduncles nearly 1 cm. long, filiform. Fruit deeply emarginate above and below, 1 cm. high, about 1.5 cm. wide, smooth, rather few in the clusters. This belongs in the Jamaicensis group.

Vitis peninsularis n. sp. No. 27150. Laguna mts., Sept 22 1930, 6500 ft. alt., growing high on Pinus cembroides. Leaves cordate-ovate-acuminate, about 3 inches long. smooth above, velvety-pubescent below and somewhat hoary. Fruit blue-black nearly 1 cm. wide. fruiting copiously. Tendrils stout, petioles about an inch long. Leaves regularly low-serrate and with teeth ending in sharp prickles $\frac{1}{4}$ mm. high and callused.

Condalia Parryi Gray has chrome-yellow fruits 1.5 cm. long by 1 cm. wide, round and smooth in cross-section, elliptical, rather acute at both ends, triangular-apiculate at tip, the pulp of pod 1-2 mm. thick, sweetish and a little bitter, seperating readily from the smooth seeds which are chocolate colored and obliquely beaked at both ends and a little flattened and with traces of two sharp lines along the sides, the walls are very bony and hard and 2-2.5mm thick and reddish, with 2-3 seeds in each cell, which seeds are round The pedicels are about $\frac{3}{4}$ inch long and mostly single in fruit The fruits fall quickly at maturity. The bushes are 6-8 ft. high usually and much branched and green.

Abutilon barrancæ n. sp. No. 27162 La Barranca. Guadalajara, Nov. 19 1930. A slender shrub 3-6 ft. high with nearly simple stems ending in a narrow panicle. Stems shortly-pubescent with rather long stellate hairs from a pustulate base and inclined to be glandular on the inflorescence. Leaves many, 4-6 inches long, 7-nerved, ovate-acuminate to ovate-lanceolate-acuminate, somewhat cordate below, on stout petioles an inch long. with nerves raised below, softly pubescent below with long-rayed

stellate hairs, nearly smooth above and with surface appearing as if scurfy, with veins impressed. The stout pedicels ascending and jointed near the tip, half an inch long. Flowers pale-yellow and with rounded petals about 1 cm. long. Calyx rather rotate-spreading in flower, with lobes triangular-ovate-acuminate and about 8 mm. long, stellate-pubescent as are the carpels, about as long as the fruit. Fruit depressed-globose and truncate at tip. Carpels 2-seeded, about 10, minutely beaked at the blunt tip, 3 mm. long. Seeds angular, barely puberulent. Leaves low-crenate.

Sida rajoides n. sp. No. 27163, Primiera Agua Sierra Giganta Oct. 19 1930. A slender and erect bush 3-5 ft. high racemosely branched above, the whole upper part becoming a compound and leafy panicle. Whole plant minutely and velvety-stellate-pubescent even to the fruit. Leaves ovate, from a truncate to cordate base, thick, 2-4 inches long. gradually reduced above, obscurely and doubly crenulate, 7-nerved from the very base and with veins conspicuously raised below and impressed above, barely acute. Flowers umbellate, 2-5 on the ends of a common peduncle an inch long and arising opposite a leaf, and at tip bracteate with linear and caducous bracts 1 cm- long. Each flower on a filiform and reflexed pedicel an inch long in fruit. Calyx lobes lanceolate-acuminate, 8 mm. long, not enlarging in age. Petals purple, fan-shaped, about 1 cm. long and much exserted. Fruit rhomboidal, about 1 cm. long and wide, papery, 5-celled (cells 1-seeded), splitting through the junction of the valves and not through the back and valves explanate at last. Fruit conspicuously winged at the junction of the valves and just below.

Sida stenopetala n. sp. No. 27142, La Barranca, Guadalajara, Nov. 16 1930. Annual and erect and slender plant racemosely branched above in an open panicle. Basal leaves triangular-ovate-cordate, the blades 2-3 inches long, green, sparsely stellate-pubescent on both sides, passing gradually into linear ones above which are entire and hastate-lobed below, with the ears 1 cm. long and deflexed, root leaves crenate. Panicles very open and diffuse with elongated branches and the filiform peduncles 1-3 inches long. Calyx about 5 mm. long, with triangular lobes half as long, not enlarging in fruit Flowers very narrow, an inch long, purple, with the petals separate and conspicuously stalked oblanceolate, 8-9 mm. long. Staminal column exserted as in Kosteletzkia, 2-4 mm. long. Anthers didymous and with a conspicuous white connective between the cells. Fruit about 8 mm wide, of about 10 carpels which are hispid at tip and truncate. and eared on the angles. Seeds black, truncate at tip, with the, arched back flat or a little grooved along the middle and rugose, with the sides concave and plane. One would naturally place this in Kosteletzkia but the fruit characters are those of Sida. The flowers are very dark colored.

Sida rajoides. Add to description,
junction of the valve just below the middle where it is 4 mm. wide and narrowing toward each end. Fruit strongly beaked, tho beak 4 mm. long, and at last splitting into 5 needle-like awns Seeds blackish, about 2 mm. long, half oval, rather pointed at both ends and longitudinally and fiinely striate-pitted. Pods conspicuously exserted. At first one is inclined to take this for a Waltheria for it has that habit. Nos. 5?170 from east of Loreto and 27166 from the Cape.

Hermannia Palmeri Rose reminds one of Hibiscus and Triunfettia, but the 5 linear-lanceolate anthers opening by pores at the tip prevent its being in either genus. The anthers are described as connivent, but they are not. The oval fruit is covered with hair-like barbs with reflexed hairs on them and with the tip anchor-like with half a dozen sharp arms reflexed and radiate. The flowers are conspicuous and yellow.

Helianthemum glomeratum Lag. is quite common at the Laguna, growing on the open plain, and is a tufted shrub about 2 ft. high, appearing like an Œnothera when in bloom. It seems too near to H. Canadense.

Hybanthus peninsularis n. sp. East of Todos Santos at Borego ranch and at Cayuca ranch, Oct 23 1930. A tufted perennial 2 ft. high, inclined to be shrubby below, racemosely branched throughout, and with weak and herbaceous stems, ashy on young parts with short and incurved hairs as if minutely woolly. Leaves roughened on the ribs, lanceolate-acuminate, coarsely toothed, variously cuneate below, narrower above thin, on a petiole 1 cm. long, 2-3 inches long. Flowers in short terminal racemes, and single in the axils of reduced leaves, on pedicels 5 mm. long, spreading, dull-white. Calyx lobes elliptical and acute and inclined to be lanceolate, 2 mm. long and as long as the globose pods, ashy, hyaline on the margins and green in the center and 1-nerved. Petals white, barely as long as calyx, with the V-shaped blade-like apex. Pods rather oblate, smooth, green and pointless, 3-valved with smooth, large, light-yellow and triquetrous seeds

Lechea depressa n. sp. No. 27117. The Laguna, Laguna mts., Sept. 22 1930. Plants growing in rocky places under rocks in tufts about 4 inches high. Stem innumerable from a thickened crown, fillform, the upper half becoming an open paniele of compound racemes, the flowers of which come out opposite but below the corresponding and green bracts. Leaves imbricated, very many, bisulcate below, 5 mm. long. linear, acute, appressed-strigose-hairy, as is the calyx. Flowers chestnut-colored, with the petals not exserted, and the many stamens barely shorter with didymous anthers. Fruits globose, 2 mm. long, with the valves splitting away from the erect partition and leaving the vertical and obliquely-ovate seeds single in each cell. This

species is manifestly near to L. minor which has the same pubescence.

Mentzelia barrancæ n. sp. No. 27101, La Barranca, Guadalajara, Nov. 15 1930. Plants resembling M. Conzatii Greenman. Shrubby, with brittle stems erect or nearly so but spreading and openly branched. Pubescence throughout minute, but inclined to be hoary, of simple but very warty tapering and appressed hairs. Leaves lanceolate from a nearly truncate base, doubly and laciniate-serrate, 2-4 inches long, long-acuminate, thin, the upper ones inclined to be opposite, all on short petioles. Flowers light- orange-yellow, nearly 2 inches long. Sepals filiform-subulate, 1.5 cm long. Petals oblanceolate. Pods oblong, 1 cm. long. Seeds few, oblong and rugose. Stamens many, with filaments about an inch long.

Cereus pecten-aboriginum Wat. So far as I can see, this is a form of Pringlei Wat. The description of the flowers tallies and the frufts are the form with fasciated areoles. The species near Guadalajara has somewhat less ribs but it is hardly probable that there can be two species with the same pods and flowers as in Pringlei. I incline to think that the ripe fruit of Pringlei would be edible when the spiny coat is stripped off. There is a kind of fasciation in Cereus where there is an elongation of the spines which the natives call "viejo" old man, whiskered cactus. Growers say this occurs only on flowering twigs, a fact that I doubt. I regard it more like a cancerous condition. It is most common on C. Schottii, but appears on the cardons which they call the big Cerei. The opposite condition occurs on C. Pringlei, absence of spines which led Britton and Rose to propose C. calvus which name they abandoned later on as not good, but which I think should be retained as varietal for the great Loreto form **Cereus Pringlei var. calvus.** These trees are gigantic, reaching 40 ft. high and having a trunk 2 ft. thick and with 20 to 30 branches each a foot thick.

The flowers of Pringlei are 3-4 inches long and stout and thick, black-purple without and white within and grow near the tips of the stems on the south side and the fruits form a great chestnut colored burr 4 inches wide.

Cereus gummosus has the long and tapering flowers of the night-blooming class and probably opens at night for it is open in the morning. The stems are decumbent and rooting near the sea but straggling upward in the interior. The fruits are pear-shaped and spinose till maturity when they turn purple and the spines fall off leaving the juicy and edible pear 4 of which make a meal, They call it " petaiya agria" at Loreto It blooms all the year but flowers and fruit are scarce.

According to Bacigalupi in Cont. Gray Herb. 95 21 my Cuphea Wrightii is a good new variety (nematopetala Bac.). It is my no. 35 of the 1884 collection which is the same as my no. 24989 from Ramsey canon Ariz. distributed as C. Palmeri.

Œnothera Berlandieri Spach appears tobe a good species of the Tropical life zone below Laredo Texas, but is placed as a variety of speciosa by Munz in his revision. It grows only in the Tropical, forming large mats 20 ft. or more in diameter and has pink-purple flowers, while speciosa has white and seems to be a winter annual, though plants cultivated here as speciosa are perennials. Speciosa covers many square miles in the Lower Temperate as a winter annual.

Cymopterus purpurascens Jones was supposed and intended by me to be the same as C. glomeratus var. purpurasceus Gray in Bot Ives and was fully described by me, but pupurascens and purasceus are not identical words and for that reason my name must stand for the species and not Rose's substitute. At the time of publication I did not know that there was a difference.

Deweya, Velæa Arracacia, Tauschia and Drudeophytum.

Rose takes up the older Velæa for Deweya in his first revision, in the second relegates Deweya to its type, argnta, and creates Drudeophytum for the other species, and apparently without good reason.

McBride combines them all in Tauschia along with Arracacia. That the genera are all closely related is evident, but their place in the family was not attempted. A close study of Arracacia Brandegei in the field in 1930 shows its relationship to Osmorhiza. I incline to think that Deweya and Tauschia may be congeneric and possibly some Arracacias should go to Tauschia but I propose keeping up Arracacia. This genus as I understand it has thin leaves, spinulose on the margins, and corky and raised ribs on the almost cylindrical fruits, in cross section, the commissure being very narrow and with a single oil tube in the intervals, 2 in all, and without angles at the junction of the commissure with the face. Tauschia has a tendency to have leathery leaves and is destitute of corky and raised ribs. Drudeophytum has no standing.

Arracacia Brandegei **var. sylvatica n. var.**

Typical Brandegei is a plant of the Tropical hills of Magdalena Island and goes up to the upper limit of the zone in the Lagunas. The plants are coarse and tall, 3ft. or more high with hollow and inflated stems and very large and coarse leaves mostly in a rosette at the base, with ovate leaflets cordate to rounded at the base and 2-3 inches long, and finely spinulose-serrate, but thin. Flowers described as purple, but normally yellow. The

variety has stems as slender as Osmorhiza nuda and are either erect or decumbent and widely spreading. The basal leaves are ternate and with divisions pinnate into 1-5 pairs of long-acuminate leaflets cuneate at base and inclined to be doubly spinulose-serrate and 1-3 inches long. The fruit is oval-ovate to linear-elliptic and 1 cm. or less long, almost cylindrical in cross-section, and smooth. The roots, unlike those of Osmorhiza, are fleshy-woody and coarse, large, and vertical. It has the same almost capillary rays much elongated, and the involucre is wanting as a rule, but sometimes is represented by a short leaf, mostly of 3 leaflets. The flowers are yellow. The whole habit is that of Osmorhiza, and it grows in the shade of pines and liveoaks on the top of the Laguna mts., Sept 22 1930, No. 27071. Typical Braudegei, my No. 24152 from the eastern slope in 1928 is very coarse and large, growing in damp places, in the open in the upper part of the Tropical and below the liveoaks, one would consider distinct but there are intergrades.

Arracacia Tapalpæ n. sp. Type in Pomona coll. A low plant with the habit of Pauschia nudicaulis and about the same hight, and, like it, widely spreading, with similar leaf-sheaths on the upper leaves (inflated and with winged petiole), and with the same (3-4 pairs) number of leaflets, but leaflets rather narrowly ovate, acute, and incised instead of oval-ovate and minutely crenate and obtuse, about ½ inch long. Flowers yellow. Umbels simple as in nudicaulis, without involucre or sometimes with a leaf-like one. Rays hardly 1 cm. long, rather few. Involucels of several linear and blunt bracts as long as the pedicels and green. Fruit broadly oval-ovate, 5 mm. long by 4 mm. wide, acutish, much rounded and with thick, corky and raised ribs. Field notes. Plants growing singly from a tapering taproot 6 inches long and ½ inch thick at tip. Got at spring in wet soil under trees close to foot of mt. about 200 yds from Ferreria de Tula Tapalpa mts. Jalisco 35 miles north of Sayula at 7800 ft. alt. Old leaf petioles at crown none or very few and papery, with the earliest leaves reduced to sheaths an inch long and with or without minute leaflets at tip. At fruiting time the stem is not over an inch long and is erect, but the root does not reach the surface, so that the stem on coming to the top branches out flat on the ground with the first peduncle leafless and 1-4 inches long and prostrate or a little ascending and with tip usually erect. In fruit the peduncles seem to stiffen and be more erect. At the point where the first peduncle starts is a large and mostly green sheath like the first leaves and usually has 2-3 incised leaflets at the end but alway short and small, from the axil of this leaf come 1-2 peduncles always centrifugally with simleaf-bracts in the middle. These are occasionally again 2- or rarely 3-branched and all but one leafy bracted. One would think that this kind of development would lead to an indefinite growth, but none of my plants are over 4 inches high. There are no other stem

leaves than these bracts, but the root leaves are often half a dozen and 3 inches long. with proper petiole shorter than the sheath and with about 6 pairs of distinct and ovate to lanceolate leaflets with a cuneate and generally sessile base. These leaflets are never a third inch long and are doubly and irregularly serrate toward the tip where they pass into variously cut and lobed sections, the teeth are callus-tipped. Flowers yellow. Involucre none, represented by a ring of short and woolly hairs which is found at the base of all leaf-bracts on the stems. The young fruit broadly ovate and would be oval were it not a little contracted at tip, 3-4 mm. long, with broad and rounded corky ribs, shallow and widest in the middle

Spermolepis divaricata (Walt.) Raf. Neog. 2 1829. I note 3 blunders of Coulter & Rose on page 87 of their monograph. The genus is feminine and not masculine, and Britton was not the author of the combination.

Apium depressum n. sp. No. 82793 Pom. Coll. Herb. Lake near San Miguel Zacatecas Mex. May 6 1892, Jones. A depressed and apparent winter annual a few inches high, either stemless and with leaves and peduncles congested at the root or with short and decumbent stems and long peduncles. Leaves tripinnate, with final segments linear and strongly 3-nerved, 6 mm. long. Fruit oblately round, rather truncate at the end, the 2 seeds appearing as half-oval, with equal corky ribs and smooth, about 1mm long, manifestly allied to A. repens.

Bumelia cuneifolia n. sp. No. 27850, Arroyo Undo, Sierra Giganta, Oct. 26 1930. Leaves fascicled in knots and with single flowers on pedicels 1 cm. long. Leaves 1-2 inches long, spatulate, with rounded tip and slightly petioled, seemingly smooth but minutely puberulent, gray, with veins barely visible. Thorns few and short. This would be taken for B. reticulata Brandegee but leaves very different. A low and rigid shrub with dark bark.

Parsonsia dispersa n. sp. No. 27398, La Barranca, Guadalajara, Nov. 25 1930. Allied to Cuphea Cuernavacana Rose and glandulosa Jones. An erect annual and widely branched into filiform branchlets, long-hairy-black-glandular throughout. Leaves very thin, elliptical-lanceolate-acuminate, about 3 inches long, minutely crenulate, truncate to cuneate into a short petiole, many. Upper internodes short. Flowers few and in racemose clusters, about 1 inch long, conspicuously spurred and strongly green-striped calyx black-hairy on the stripes. Petals bluish-purple, oblanceolate, long-clawed, nearly 1 inch long. Seeds rounded-oval and 3 mm. wide, strongly margined, dark and mostly mottled, flat. peduncles $\frac{3}{4}$ inch long, ascending and with flowers reflexed. In fields, showy.

Parsonsia purpureocalycis n. sp. No. 27148, mts. east of Loreto on mesas Oct 17 1930. Plants allied to P. microcephala and ternata apparently. Rather tall and slender, probably shrubby below, 3-4 ft. high and erect. Rough-pubescent throughout to even strigose on the young parts and calyx with white and ascending hairs, the larger hairs with pustulate base surrounded by a circular row of cells, the raised nerves of the leaves consist of several parallel cells. Lower leaves lanceolate, sessile, about 3 inches long, entire, acute, penninerved and with nerves impressed above and raised below, shining though minutely roughened, not glandular, reduced above. Branches racemose, ascending. Flowers rather racemose above, not truly axillary, ascending on stout pedicels about 4 mm. long. Pods oblong, 1 cm. long, truncate, paper-walled. Seeds flat, smooth, purple-mottled and about 2 mm. wide, round but truncate to a little cordate at both ends. Calyx 2 inches long by about 4 mm. wide, not spurred below but truncate, a little wider, black-purple except at base Calyx lobes deltoid, very hairy. Petals deep-orange, slightly exserted.

Parsonsia P. Brown Hist. Jam. 199 t. 21 1756. On p.1014 of his Shrubs and Trees of Mexico Standley gives Adanson Fam. 2 234 1763 as the place of origin, but had he looked up his citation he would have seen that Adanson quotes Brown as the author.

Gonolobus rotundus n. sp. No. 76076 Pom. Herb. Mound Valley Sierra Madres Chihuahua Sept 26 1903 Jones, at 7000 ft. alt. on prairies. Prostrate and spreading and filiform stems nearly simple and 1-2 ft. long. Internodes short so that the leaves overlap Leaves cordate-oval .5- 1 5 inch long, very obtuse, veiny, 7-nerved at base, smooth except for strigose hairs on the veins and stems. Pods smooth, about 3 inches long by an inch wide in the middle, triangular-acuminate at tip, less so below, sessile. Flowers absent. Petioles about 1 cm. long.

Serjania Papilio n. sp. No. 27327, La Barranca, Guadalajara, Nov. 19 1930, growing on bushes like Clematis does. Stems variously angled but not evidently sulcate nor striate but white-woolly-pubescent in lines. Leaves pinnate, of 5 leaflets, the laterals almost sessile, the terminal one cuneate into a short petiolule. Leaflets ovate to oval, 1.5-2 inches long, biserrate rather deeply and irregularly, shortly and abruptly acuminate, rather thick, white-woolly below and nearly smooth above, strongly venose on both sides, the terminal one winged on the petiolule. Peduncles stout, the longert ones 3-5 inches long and with a very

stout coil at the end. Flowers white, rather many, on a short rach s and nearly sessile, 3 mm. long, open, the spatulate petals and fi aments sparsely hairy throughout. Filaments recurved at tip. Anthers elliptical and puberulent. Fruit about an inch long by .5 wide, cordate, with each wing 12 mm. wide, straight veined and shining but minutely woolly, produced a little (1 mm. wide) around the tip of the cell. Cells flattened slightly, but nearly globose, 3 mm. wide, not inflated. This seems near S. vesicosa.

Ipomoea Acaponetensis. n. sp. No. 23347, Acaponeta Nayarit (Tepic) Mex, March 3 1927. A free and tall climber Leaves large, inclined to be tripartite and with broad sinus, softly and velvety pilose, 4 inches long, sinuate-toothed and very wide. Internodes long. Flowers many, in corymbs, on pedicels 1-2 inches long, about 1 inch long, with tube half the whole and then campanulate and with short lobes. Calyx lobes ending in filiform tips 1 cm. long. Pods globose-orate, 1 cm. long. Seeds black.

Drymaria Fendleri var. **perennis n. var.** Stems 1-2 ft. long, perennial. Leaves reniform, triangular-acute, wavy on the margins and on petioles 2-3 mm. long. Flowers puberulent. Sepals 3 5 nerved, pungently acute. No. 27050, the laguna, Laguna mts., Sept. 23 1930.

Drymaria barrancæ n. sp. No 27051a, La Barranca, Guadalajara, Nov. 17 1930. Growing with D. Blasiana Jones Cont. 15 12 . A weak and widely spreading annual with capillary stems Leaves reniform, pointless, inclined to be deltoid at base, on capillary petioles half to a third their length, sparsely long-hairy, as is the whole plant. Flowers single, in open cymes, on pedicels not over an inch long. Sepals oblong-ovate, pointless, narrowly hyaline-margined. Petals very narrow and about as long as sepals

Stellaria lagunensis n. sp. No. 27059, the laguna, Laguna mts., Sept 22 1930. Weakly erect from running filiform roots, widely branched from the base, 1-2 ft. long, the upper half floriferous in the axils on one side of the stems and on capillary and puberulent and ascending pedicels 1-2 inches long. Sepals about 4 mm. long, ovate-lanceolate, green, longer than the petals and shorter than the capsules. Seeds black, shining, lenticular, rather sharp-edged, obliquely reniform .5 mm. wide. Leaves linear, 1 inch long. Stipules absent or reduced to hairs.

Coldenia Loretensis n. sp. No. 27394 Mts. east of Loreto, Oct 17 1930. A prostrats shrub, white-hoary, in mats a foot in diameter. Stems zigzag. Pubescence specially dense on the petioles Leaves with blade about 3 mm. long, on stout petioles half as long, entire, rigid, deltoid-ovate, with revolute margins rather erose and with midrib imprassed, acute, clustered at the end of twigs. Flowers white, about as long as the leaves, with calyx lobes barely visible. Bark of stems exfoliating.

Wahlenbergia filipes n. sp. No. 27322, Orendain Jalisco, Nov. 27 1930. Growing in waste places. Plants weak, creeping and rooting at the joints, probably perennial but very frail. Stems green, conspicuously ribbed and racemosely branched above and 6 inches high. Leaves cordate to cordate-ovate and acute, coarsely few-toothed, about 1 cm. long, smooth, sessile. Flowers single in the upper axils, on filiform peduncles an inch long. Calyx 5-cleft to the base and with the linear lobes 2 mm. long. The ovate capsule about as long as the calyx and 2-valved to the base. Flowers deep-blue with yellow throat.

Ruellia megacantha n. sp. No 27387, La Barranca, Guadalajaca, Nov. 25 1930.. Growing on steep slopes, a very slender and openly branched shrub, 4-6 ft. high, with leaves inclined to be clustered at the ends of twigs. Young leaves rather shaggy with dense flattened white hairs, but without glandularity, becoming almost smooth in age. Leaves 2-3 inches long by 1.5 wide thin, not closely feather-veined, elliptical-ovate, shortly acuminate at both ends, on petioles not over 1 cm. long. Flowers blue, 2-2.5 inches long, about 1.5 inches wide, puberulent, with rounded lobes ¾ inch long, widely spreading, tube 1-2 cm. long, then funnel-form and as long. Calyx lobes hardly 1 cm. long, narrow, about as long as the oblong-obovate and almost sessile fruit. Flowers about 3 in a leafy cluster at ends of twigs. Two calyx lobes filiform, the rest wider. This species close to R. Californica but without its pubescence, and flowers twice as large and leaves relatively more acuminate below. A showy plant.

Beloperone intermedia n. sp. No. 27436 Cayuca ranch, Sierra Giganta Oct. 23 1930. A shrub 3-4 ft. high, openly branched, slender and leafy. Stems minutely white-pubescent which condition extends to petioles and calyx, no glandulosity. Leaves about 1 inch long, entire, veiny, thin, smooth except for a little pubescence on lower veins, obtusely ovate to oval-ovate and abruptly cuneate into a short petiole. Flowers single in the upper axils, and single in the cluster of leaves. Bracts variable, mostly spatulate and rarely over 1 cm. long. Flowers red, 2 inches long, cleft down ⅓. Calyx 2-3 mm. long, its lobes oblong-ovate to lanceolate and ashy. Anther cells equal, not parallel but the lower white-spurred. Seeds rugose. Technically this should be a Siphonoglossa but it seems like a depauperate B. Californica, but whole habit different, seeds those of Purpusii, color of flowers much redder and corolla tube barely 2 mm. wide, no viscosity, inflorescence very different.

Plantago Patagonica. I cannot see any good reason for splitting this into several species as has been done.

My No. 23691 is Crusea parviflora H. & A. ,not villosa.

Houstonia peninsularis Brandg is an openly branched shrub with leaves mostly in fours. The flowers vary much in length from.5-1 inches long. Lobes of corolla about 4 mm. long and widely spreading, for 4 mm. more the corolla tube is enlarged a half below the lobes then rather abruptly contracted to the very slender tube.

Borreria lagunensis n. sp. No. 27124, the Laguna Laguna mts Sept. 22 1930. Tufted woody plants growing under liveoaks, about 2 ft. high. with many stems from the crown of the vertical root. Stems simple, with about 4 pairs of leaves, asperulous with very short white hairs apparently from a pustulate base. Leaves narrowly linear-lanceolate, acuminate at both ends, more so toward the tips, entire, with revolute margius, opposite, white below and green above, somewhat asperulous with scattered hairs but surface appearing as if covered with flat granules. Flowers in dense terminal rarely proliferous heads, dark-purple, 5 mm. long, with slender tube and ovate lobes about 1 mm. long and equaled by the oblong anthers, tube slightly longer than the triangular-subulate (and at length acerose) and hispid calyx lobe.

Spermacoce Jaliscensis n. sp. No 27118, Orendain Jalisco, Nov. 30 1930. Plants growing in tufts 1.5 ft, high, strictly erect, shrubby below, branching a little above the middle. Stems smooth. Leaves smooth, linear, revolute, strongly ribbed, fascicled, acuminate at both ends, nearly sessile, entire, 2 inches long by 3 mm. wide, with few or no setæ in the axils. The sheathing stipules truncate and with few setæ. Inflorescence corymbose and with few cymosely arranged heads. Peduncles 1-3 inches long, strict. angled, fistulous at tip and winged there, mostly with a cluster of leaves subtending the half-inch heads. Calyx lobes green, linear, rigid, acerose, smooth, tube hairy. Flowers minute. Common.

Bouchea flabelliformis n. sp. No. 27439, Trinufo Oct 6 1930. Erect and simple annual much like B. dissecta Wat. and with the same ashy pubescence. Stems channeled, 1-2 ft. high and ending in a bractless raceme 4-6 inches long. Leaves opposite, oval-ovate, cuneate into the filiform petiole which is ½ as long as the blade, the whole 2-4 inches long, dissected nearly half way to the midrib into 7-11 oblong and apiculate lobes about 1 cm. long, occasional lobes again cut. Flowers 1 cm. long. Calyx tube linear, clavate, the subulate teeth about 1 mm. long. Corolla exserted, nearly as long as calyx tube, rather labiate and 4 mm. wide at tip, blue. Frust twice as wide as in dissecta and somewhat exserted.

Stemmadenia rugosa n. sp. No. 27317, La Barranca Guadalajara, Nov. 17 1930. A shrub 6-10 ft. high with slender branches, entirely smooth Leaves oblong-lanceolate-acuminate, subcordate below, 3-6 inches long, on petioles nearly as long,

entire, 1-2 inches wide. Flowers in terminal cymes, white, about 3 cm. long and nearly as wide, with short tube barely longer than calyx Calyx lobes about oval and rounded, 1 cm. long. Corolla lobes finely wrinkled when dry, connected by a thin membrane. Growing in rocky places.

Viburnum deltoideum n. sp. No. 27306. The Cape, Sept 14 1930. A shrub about 6 ft. high, with slender and openly branched stems. Leaves ovate to deltoid, triangular-acute at both ends. low-crenate, smooth or ashy, on slender petioles half as long as the blades and not margined. Flowers 1 cm wide, white and with tube as long. Calyx lobes linear-subulate, 1 cm. long. Umbels mostly sessile. Fruit wanting.

Lobelia amabilis n. sp. Laguna mts. Sept. 22 1930. An erect and slender annual about 2ft. high, with short internodes and many thin leaves. Basal leaves much reduced, ovate, about 1 inch long, triangular-acute, cuneate into the slightly margined petiole which is nearly as long as the blade, laciniately and rather coarsely few-toothed. Middle leaves the largest, lanceolate-acuminate, about 3 inches long and with slender petiole $\frac{1}{3}$ to $\frac{1}{2}$ as long as the blade more deeply and irregularly cut-toothed, uppermost leaves almost linear. Whole plant up to the smooth inflorescence sparsely strigose-hairy. Plants inclined to be cymosely branched above, but inflorescence of 1-3 racemes 1-2 ft. long, the flowers brilliant-purple, about 1 cm. long, white-striped below and with the 3 lower petals broadly ovate and about 4 mm long; the two upper ones linear and short. Calyx boat shaped and split nearly to base, about 5 mm. long, with all its lobes linear and 3 mm. long, the lower remote from the upper. Flowers slightly spurred. Pedicels 1 inch long and filiform, ascending. Fruit absent. A very graceful, delicate and pretty plant.

Lobelia Loretensis n. sp. No. 27279. Growing in wet places in tufts at Primera Agua, Oct. 26 1930. Allied to L. splendens, 2-3 ft. high, erect and strict, very leafy with imbricated leaves linear-lanceolate, closely and finely spinulose-serrate, smooth, about 4 inches long by $\frac{1}{2}$ inch wide, veiny, almost sessile. Flowers at first yellowish with red stripes, then cardinal. 1.5 inches long, with narrow and nearly linear lobes about as long as tube. Calyx tube 2-3 mm. long, a little shorter than the triangular-subulate and green lobes. This differs from L. splendens in the serration of the leaves, short and linear corolla lobes and short calyx. There are forms approaching this from Texas with very long and linear calyx lobes, by Lindheimer.

Mercurialis glabra n. sp. La Barranca, Guadalajara, Nov. 17 1930. A weakly erect annual, 6 inches high, with leaves and branches nearly opposite. Leaves thin, elliptical, shortly acuminate at both ends, obscurely crenate, smooth but with short

hairs on nerves and margins, 1-2 inches long, almost sessile. Stems channeled and seemed to be pubescent in lines. Pods ovate, deeply 3-angled and 3-celled, 4 mm. long, splitting to base at maturity. Seeds 2-3 in each cell. black when ripe, a little flattened coarsely rugose at least around the margins, shining, 1.5 mm.' wide. This is outside the generic limits but cannot go elsewhere. Manifestly allied to M. annua L. but cells apiculate when open, and not blunt and hairy as in annua, and the seeds have the few pits very wide and not pavement-like as in annua.

Cuphea. Since printing page 50 I incline to take up Parsonsia on page 64 and so my C. Watsoni becomes **Parsonsia Watsoni**

Vernonia camporum n. sp. No. 27696. On prairies, at Orendain, Jalisco, Nov. 27 1930, growing with Cacalia, etc. Strict and tufted herbs, 2-3 ft. high, with simple stems, drying black. Heads small, 4-6 mm. long and 4 mm. wide. The pappus slightly tawny, 2-3 mm. long, bracts with black tips, narrowly oblong, a little floccose and the outer ones acerose-tipped. Akenes tapering from the truncate tip, and about 9-ribbed. Leaves nearly sessile, lanceolate, leathery, 3 inches long by 1-2 cm. wide more evenly low-serrate, roughened on the margins and punctate, ascending, many.

Vernonia viarum n. sp. No. 288 of 1892 from Chiquilistlan Jalisco May 30. Erroneously identified by B. L. Robinson as V. Deppeana. A shrub with rather compact and cone-like panicles of many heads on short and divaricate pedicels. Whole plant rough ad grayish with minute pubescence. Leaves elliptical-lanceolate, and shortly acuminate, about 3 inches long by 1 wide, nearly sessile on a stout petiole and rounded to truncate below. Heads nearly globose, about $\frac{1}{4}$ inch long. greenish, the bracts flat, oval, acutish, somewhat lacerate on the margins, about 4 ranked and successively shorter and a little shorter than the white pappus

Vernonia floccosa n. sp. No. 27700, La Barranca, Guadalajara. Nov. 23 1930. Plants tall, erect rigid, with striate-angled stems, 4.6 ft. high, corymbosely branched above Stems smooth below, the upper floccose. Upperside of leaves and the heads densely white-woolly. Leaves lanceolate, leathery, venose, corrugated, about sessile, 2-3 inches long, sharply low-serrate. Oeasionally sessile, in small clusters at the end of the long common peduncle (4-6 inches long), which is leafy bracted at tip. Heads hemispherical, 1 cm long, with closely appressed, oval-ovate, apiculate bracts buried in wool, the longest about as long as the pappus which is composed of many flat and filiform parts enlarging above and with a secondary series of similar and acute ones 2-3 mm. long. Akenes densely setose-pubescent and very short. The plants closely resemble V. Leopoldiana. Growing on prairies.

Eclipta pusilla n. sp. No 27739, Arroyo Undo, Oct. 25 1930, in waste places. Plants low, 3-5 inches high, erect, corymbosely branched and with heads cymosely arranged on peduncles erect and not over 2 inches long. Leaves elliptical-lanceolate and obtusish, entire, 1 inch long, on short petioles, ashy and minutely punctate as if glutinous. Involucre a single piece but 5-toothed and with hyaline edges lacerate, also ashy with tangled hairs. Heads globose-ovate, 7 mm. wide and with golden-yellow rays nearly as long. Ray akenes somewhat flattened and very flat-warty especially on the back, truncate and without pappus. Disk flowers large and embraced by the hyaline andhooded bracts which are as long as the flowers which are long-hairy on the midrib and hooded and lacerate at tip. Disk akenes not developed but ray akenes dominating the heads. An insignificant herb.

Stevia serrata Cav., my No 28634 from the Chiricahua mts. Ariz has no pappus bristles and S. micrantha has two long ones.

Stevia bisecta n. sp. No. 27800. Orendain, Jalisco, Nov. 27 1930. Plants slender. erect, strict, sparingly branched racemosely above, but with final clusters cymose. Whole plant ashy-woolly except the bases of scales. Stem 1-2 mm. thick. Primary leaves very deeply 3-5-toothed and lanceolate, subtending fascicles of linear and revolute ones an inch long. Petioles very short and margined. Heads about 6 mm. long and 4mm. wide and green. Scales linear, 3-nerved, acute, hairy above, in about 4 series. Akenes strongly angled, linear, black, 2-3 mm. long, half as long as the rather tawny and slightly plumose and very fine 5 pappus scales which are capillary above their $\frac{1}{2}$ mm. long triangular base. Flowers purple and very short.

Mikania anomala n. sp. No. 27806, Guadalajara. Nov. 26 1930. Growing along ditches, tufted, erect, strict, with leaves opposite, nearly linear, 2-3 inches long by 4 mm. wide, acutish, entire, rather thick. The whole upper plant forms a narrow and compound panicle of innumerable, very small and erect heads, each on a filiform pedicel 1-3 mm. long. Upper stem and peduncles woolly-hairy in narrow lines on the inner face. Heads 4 mm. long by 2 mm. wide, smooth, with 2-4 linear, convex and hyaline, loose, equal, and a little lacerate bracts. Flowers 2-3 in the heads. Corolla lobes exserted, oblong-linear and longer than the very short, wide and woolly tube. Akenes 3-4, sharply angled, smooth, cuneate-linear and with minute crown and no pappus and half as long as bracts. This quite unique plant has the corolla of Mikania but absence of climbing habit and of pappus.

Eupatorium megaphyllum n. sp. No. 27878, La Barranca, Guadalajara Nov. 1[illegible] 1930. A tall and coarse plant with square stems. 4-6 ft. high and leaver a foot or more long, lanceolate, sharply acute, with very low-apiculate teeth, abruptly con-

contracted into winged petioles an inch wide, slightly if at all connate, smooth. Flowers in short, axillary and dense panicles. Heads about 1 cm. long, with the narrowly-oblong bracts in about 3 series, and obtuse, striate-nerved and hyaline. Flowers white. Heads in compact clusters. This appears near E. compactum. but heads larger and with more flowers. Leaves 1-nerved.

Brickellia Undomis n. sp. No 27822, Arroyo Undo, Oct. 26 1930. Allied to B. peninsularis but heads congested on pedicels 1 cm long. Bracts linear and barely acute, not acuminate as in that species but leaves about the same though barely half as long and with minute pustulate pubescence. Stems white and not green, in pubescence.

Brickellia megaphylla n. sp. No. 27814, Arroyo Undo, Oct. 23 & 26 1930. A sarub, 4-6 ft. high and allied to B. grandiflora. Leaves triangular-acuminate, 3 inches long by 2 wide, from nearly entire to laciniately toothed, a little cordate, palmately nerved by 3 strong nerves at base, the central one being pinnately nerved above, and the two laterals 3-4-nerved on the outer half much as in Eupatorium collinum. Pubescence short and flat but evident. Seration of leaves tending to be lastate. Plants velvety-pubescent. Petioles 1-2 inches long. Flowers in an axillary ample corymb, on short (2-6 mm. long) pedicels and erect. Bracts about 4-ribbed and 1 cm. long, acate, green. Akenes 10-ribbed, densely pubescent and black akenes not nearly smooth, It differs from Brickellia grandiflora in the akenes and in the shrubby habit, much larger leaves and pubescence. The stigmas are sometimes elongated as in Eupatorium, see No. 27813.

Robinson in his revision creates a section Stevioideae for B's pulcherrima which I think should be called Stevia pulcherrima.

He also keeps up Gray's B. squamulosa which is a pistillate Baccharis squamulosa.

Brickellia cayucensis n. sp. No. 27818. Cayuca ranch, Oct. 23 1930. Near B. Coulteri. Climbing high and widely branched divaricately and with slender branches. Leaves cordate-ovate, to almost deltoid, 1-1.5 inches long, papillately roughened and unequally crenate-serrate, acute, on petioles 1 cm. long. Stems white-barked. Heads few, at the ends of the branches and 1 cm.long, about 10 flowered. Scales smooth, linear and strongly ribbed. Flowers white Pappus white. Akenes densely hairy.

Brickellia diffusa n. sp. No. 27821. Guadalajara, Nov. 24 1930. Tall and openly branched, 2-3 ft. high. Leaves cordate-ovate, 2 inches long, on very stout petioles 1 cm. long. thick and leathery, shortlyacuminate regularly serrate, covered beneath with densely white areas of wool between the meshes as if stellate-pubescent. Stems 1-2 ft. long, divaricately branched into an open panicle half as long. Outer akenes triquetrous and slightly winged. Awns somewhat shorter.

Xanthisma Texanum DC. I think this genus is more intimately related to Grindelia than to Aplopappus, and it has the habit of that genus.

Amblyolepis setigera DC. There is little doubt that this genus is too near the Hoopesia group of Helenium, but whether it is congeneric with the genus is a problem.

Lagascea decipiens. This puzzling species and genus departs from ideal Compositæ structure in the heads, and one is reminded of Mexianthus and one species of Eupatorium by the individual flowers being rotate-spreading in the head. The problem is exaggerated by the bracts which cover the disk and are gamophyllous and inclose the single flowers. The structure of the anther tube is the only sure index of its Composite origin. Were it not for I. uniflora having two flowers in a bract the problem of relationship would be hard.

Melampodium minutiflorum n. sp. No. 27738, La Barranca, Guadalajara, Nov. 17 1930. Weak and widely spreading annuals with filiform stems intricately branched. With innumerable oblong heads 3-4 mm. long and with very minute white rays scarcely visible. Leaves opposite, oblong, inclined to be lanceolate, 5 mm. to an inch long, soft and thin, on filiform petioles 2-3 mm. long. Involucral scales 2-4, concave, oval, thin, several-nerved, glutinous. Ray flowers 2-4, with very broad rays for their length, reflexed. Akenes 1-2 mm. long, conspicuously cup shaped and warty all over the back, not produced at the rounded summit, flat on the inner face and 1-nerved. They are not evidently a continuation of the scale and akene, Inner flowers 2-4, some with hyaline bracts; others without bracts and with linear and abortive ovaries. All flowers deciduous. Plants 1-2 ft. long. Hairs flat and tapering. Pedicels 2-10 mm. long. This grows with the next.

Melampodium anomalum n. sp. No. 27727, La Barranca, Guadalajara Nov. 17 1930. This has the habit of the last and similar leaves but nearly sessile, and with the pubescence minutely ashy and not glutinous, and plants nearly smooth. Inflorescence much more open, and pedicels 1-2 inches long and 2-bracted. Heads smooth and shining, with 2-3 short, oval, and unequal outer bracts passing into the oval, concave, hyaline, smooth, and nerved scales 4 mm. long, which are about four, then come 2-4 fertile flowers without rays, most of them acuminate into recurved (not hooded crowns with the 2-nerved part forked a little at tip. Akenes flat or a little convex and oblong, 3-4 mm. long exclusive of the beak which is variable from almost nothing to 3 mm. long. Back of akene yellow-warty in 3 lines, the central akene on the thinner side mostly flat and 1-nerved and minutely pubescent. Inner flowers with 1-3 hyaline, oblong, persistent, and empty scales, and 1-3 naked flowers with linear and abortive ovaries. Receptacular scales

persistent. This plant is manifestly Melampodioid but there is no cup-shaped area at tip of akene as in M. longicornu.

Coreopsis diffusa n. sp. No 27720, La Barranca, Guadalajara, Nov. 17 1930. A weakly branched and diffuse annual, 3-4 inches long, with short internodes, and ovate, bipinnate leaves an inch or two long and thin, with primary segments cuneate below, and final segments triangular and cuspidate and very short. Heads on filiform peduncles 1-2 inches long and scattered among the leaves, appearing radiate, at least with two series of akenes. Outer bracts few and short; the inner elliptical and 4-6 mm. long, then gradually passing into the few central ones which are linear. Outer row of akenes round, light-colored, smooth, oblong, rounded at both ends, and without pappus or markings. Inner akenes single or few, black, flattened and with inner face concave, smooth and with narrow white wing lacerate, with no pappus, oblong, 2 mm. long like the rest. This seems near Blake's C. aggregata but inner bracts narrower.

Perezia kuhnioides n. sp. No. 27693, La Barranca. Guadalajara, Nov. 25 1930. Tall, strict and smooth and tufted herb, 3-4 ft. high. Leaves eared, oblong-lanceolate, 2-4 inches long, low-toothed, and rather remotely so, leathery and rigid. Corymbosely branched above and very slender. Heads many, in capitate clusters of half a dozen heads which are 4 mm. long to the end of scales. Scales about linear, pruinose and acute. Akenes linear, narrowed above into a distinct neck and with enlarged disk-like tips, 10-ribbed. Pappus nearly white, 4-6 mm. long, copious, a little scabrous above, very fine. Flowers about 10 to a head

Perezia nitens n. sp. No. 27798, Guadalajara Nov. 26 1930. On prairies, 3-4 ft. high, strict, rather racemosely branching, pruinosely pubescent throughout and heads or young parts deciduously floccose early. Leaves oblong-ovate, shortly acuminate, finely and regularly acerose-serrate, veiny, many, appressed, a litte reduced above where subtending the inch-long heads. Heads one to few in the axils and with a larger cluster at the tip, all in a linear spike a foot or more long. Scales narrowly linear, all acuminate and the outer ones long-acuminate and all aculeate at tip. Heads about 20-flowered, rather wide. Inner scales about 1 cm. long and twice as long as the linear and barely beaked and densely pubescent akenes with stiff and ascending hairs. Stamen tube white and elongated. Corolla tube puberulent. Upper side of leaves shining. This belongs in the Wrightii group.

Notes on Perezia.

Perezia Wrightii **var. Arizonica (Gray)**, P. Arizonica Gr. It is evident that these two reputed species are not distinct.

P. Wrightii scales are ovate to oblong, rounded but often apiculate and lacerate, the outer inclined to spread, thick, not striate. Akenes scabrous, angled, beaked, with broad and disk-like crown. Pappus nearly white.

Perezia megacephala has the oblong scales acute below but not the inner ones, imbricated. Akenes smooth, deeply 8-ribbed and with no warts between, 1 cm long, slightly contracted at the ends with no disk at tip.

Perezia Arizonica and Wrightii have lacerate and ovate to oblong scales slightly ribbed and scabrous akenes with wide disk and white pappus.

Perezia oxylepis has lanceolate to linear-acuminate, not lacerate scales and beaked, scabrous. slightly ribbed akenes with a broad disk and traces of a crown.

Perezia hebeclada has scabrous, slightly lacerate scales lanceolate to linear-acuminate and acerose. Akenes slightly beaked, ribbed and scabrous.

Perezia foliosa has lanceolate, long-acuminate and rather acerose scales. smooth and not lacerate. Akenes slightly ribbed, scabrous, beaked, with a broad disk.

Perezia Lozani has oblong, very blunt and spreading thick lacerate scales puberulent. Akenes narrowed at both ends, with prominent disk, scabrous, barely ribbed and with tawny pappus

Perezia microcephala has linear, apiculate, scabrous scales, the roughness almost hairy. Akenes about half the usual length and 4-angled, scabrous,truncate and with rather large disk. pappus white as usual.

Perezia nana has puberulent, striate, ovate to acuminate-lanceolate, lacerate scales. Pappus inclined to be tawny,and akenes very-shortly pubescent and slightly ribbed, short-beaked and with broad disk as if a crown.

Perezia runcinata has linear-acuminate lacerate scales, scabrous, long-beaked akenes about 5-angled and evidently related to nana. Root tuberous.

Perezia Thurberi has ovate to lanceolate, scabrous,, not lacerate scales. Akenes very short,truncate not beaked, scabrous angled. Pappus white.

Perezia turbinata reverses the usual order by having the outer scales the narrower, all striate, acuminate, nearly smooth, not lacerate- Akenes long-beaked, angled, scabrous, with broad disk- Pappus rather tawny.

Perezia nervata n. sp. Orendain Jalisco, Nov. 26 1930. On prairies. Plants 2-3 ft. high, erect and strict, pyramidally branched above, nearly smooth throughout. Leaves thick, narrowly oblong-lanceolate and obscurely toothed, acute, tapering into a short and margined petiole. Heads about 1 cm. long, dark-colored, with rigid and closely appressed, ovate to oblong bracts. Flowers about 10 in a head. Pappus dirty-white, 3-4 mm. longer than the scales. Akenes caneate-linear, 2-3 mm. long. round, very strongly 7-nerved and with shining low warts between the ribs, truncate.

Verbesina ampla n. sp. No. 27780, La Barranca. Nov. 17 1930. Tall plants, scrubby below, with ample corymbose inflorescence, of many heads 1 cm. long and yellow rays. Leaves about 1 ft. long, opposite rather triangular in outline, with very strong veins raised and pinnate, 3-5 lobed and the lower pair of lobes the largest and triangular-acuminate. and coarsely few-toothed, upper surface papillose-scabrous with rudimentary hairs, and lower surface velvety with short hairs. Leaves cuneate into the winged petiole which is 1-2 inches long. Wings of stems 1 mm. high, thick and rounded, continuous to inflorescence. Heads very many on pedicels hardly 1 inch long. bracts in 3-4 series, linear to oblong, acutish, puberulent, lacerate, yellowish. The receptacular scales very narrow, and hyaline, with greenish, puberulent, not acerose tips, those of ray yellow and ovate, about 1 cm. long, the akene cuneate, 3-4 mm. long, somewhat flattened, smooth, with a very broad and papery ear on each side. Disk akenes linear, much flattened, narrowly winged below, slightly wider above. Awns strong and fully as long as or longer than the akenes and subulate. Proper tube of corolla short and hairy. Stamen tube black and white-striped and ending in ovate ears. Also No. 27699

Viguieria triangularis n. sp. No. 27710, Arroyo Undo Oct. 26 1930. A shrub, 2-3 ft. high, with simple stems, and branching and cymose inflorescence. Slender stems ashy, angled but not winged. Leaves opposite, 3-nerved, on slender and hoary petioles not winged and half an inch long. Leaves shining on both sides, but roughened by minute and rudimentary hairs on the nerves, acuminate, low-crenate-serrate, very rugose, about 3 inches long, almost truncate at base, reduced above. Heads few and on almost filiform pedicels 2-3 inches long. Involucral bracts narrowly linear and lax, 1 cm. long, about in one series, much longer than the disk bracts which are linear, strongly nerved, acute and rather pilose on the margins. Rays elliptical, 1 inch long and yellow, seemingly neutral, and with lacerate scales at tip of akenes and no awns. disk flowers brown. The akenes with two stout scales or awns as long as the akene, and lacerate and on the angles and with a few shorter linear and lacerate scales between. Corolla tube pubescent. scales ashy. Manifestly related to V. cordifolia.

Viguieria longiligula n. sp. No. 27708 La Barranca, Nov. 15 1930. A somewhat shrubby based herb, 3-5 ft. high, paniculately branched above subcorymbosely. Leaves opposite, 4-6 inches long, 3-nerved, silky-velvety below and nearly smooth above but covered with pustules, shortly acuminate, cuneate into a petiole slightly winged above. Petiole about an inch long. Upper leaves much reduced and inclined to be lanceolate. Heads rather cymose, on filiform pedicels not over 4 inches long, few,

with golden-yellow elliptical rays about 1 inch long. Involucral bracts linear, spreading but not lax, 1 cm. long, somewhat irregular, longer than the ribbed disk ones which are rather setose at tip and closely inclosing the akenes. Akenes of ray appearing neutral, either without pappus or with short scales. Ray akenes flat, long-shaggy on the margins and pubescent on the face, with 2 subulate awns or scales with lacerate margins and some shorter inner scales also lacerate. Corolla tube pubescent.

Viguieria magnicapitata n. sp. No. 27701, La Barranca Nov. 23 1930. Plants with the habit of Rudbeckia laciniata, erect and tall, 3-4 ft. high and simple. Leaves very thick and leathery and low-rugose, very scabrous on both sides and with pustulate-based hairs short and rigid. Leaves narrowly elliptical, acuminate at both ends, alternate, almost sessile, strongly 3-nerved entire, 4-6 inches long by 1-2 wide, many Heads nearly sessile and single in the upper axils, 1-2 inches wide, very rigid. Outer involucral scales ovate-lanceolate-acuminate, rather lax and canescent with rigid white hairs, 1 inch long or less. Disk scales rigid and linear, almost pungent, inclined to be scabrous. Disk akenes linear, triquetrous, puberulent, truncate, capped on the angles by subulate, scaly and triquetrous awns as long as the akenes which are scale-like at base and toothed, and by single intermediate scales that are oblong and rectangular, truncate and erose and rarely 1 mm. long, and white. Plants too old to determine the ligules. A very remarkable plant. Pappus persistent. Growing on the prairie.

Verbesina Cayucensis n. sp. No. 27718, Cayuca ranch, Oct. 23 1930. In open places, a slender and erect annual with the habit of V. encelioides. Whole plant ashy-pubescent with curved short hairs even to the ciliate-margined and thin and nerved bracts. Leaves ovate-lanceolate to lanceolate, 3-4 inches long, flat and thin, acuminate,, inclined to be laciniate toothed below and 3-nerved, on stout and margined petioles about 3 mm. long. Stems branching cymosely into few elongated parts with one to few heads which are erect on pedicels 1-3 inches long. Proper bracts barely 1 cm. long, oval-oblong, rounded and flat, about eight-green; then comes an inner series with as many or more hyaline ones a little longer and some of them subtending the few linear yellow rays which are not over 1 cm. long or very short. Ray akenes elliptical, flat, hardly smooth, without pappus but with a tuft of hairs at junction of the pilose corolla and akene. Disk akenes very flat and thin-winged, ending in lacerate edges, and with face upwardly pilose and tipped with a distinct crown from which 2 stout, subulate and persistent awns arise as long as the oblanceolate akene. There are no scales to the pappus but corolla tube constricted below and very pilose there. The awns of V. encelioides are evanescent and hair-like when present, and the and akenes with corky wings. and narrow bracts.

Verbesina crocata I do not recall the author of this name for this unique plant, a botanical monstrosity that seems to be trying to be a climbing shrub and dont know how. La Barranca, Guadalajara Nov. 19 1930. No. 27104. A spraggly widely spreading shrub, 6-8 ft. high with the habit of our Californian Nemophila aurita but spreading out horizontally and not on the ground, but the Composite heads give it away. The branches are set at at right angles to the trunk and are winged. Leaves inclined to be hastately 3-5-lobed and coarsely and irregularly sharp-toothed and acuminate, with broad and winged petioles 1-2 cm. long, and wings decurrent on stems. Leaves dark-green, rough-pubescent with very sharp and tapering hairs from a conspicuously pustulate base, and shining as if beaded. Peduncles stout, cymose and terminal, ashy, erect, with the single heads oblately globose, 1 inch wide and dark yellow or black and rayless, but with fertile ray-flowers, and with many thinly-winged, smooth, black and flat akenes with 2 awns and no scales. Chaff of receptacle flattish and not embracing the akenes. Disk flowers yellow, and their akenes linear and wingless. Involucral scales many, unequal, linear, acute, rough, closely appressed. Flowers many in the heads.

Verbesina pustulata n. sp. No. 27711, The Laguna Laguna mts., Sept. 22 1930. A tall herb 3-4 ft. high, growing in clumps. Whole plant even to the bracts covered with yellow pustules which often end in very slender and crisp hairs, particularly on the under side of the leaves. Leaves ovate, acuminate, about 3 inches long, truncate below, winged on the petiole which is 6 mm. long and stout. Leaves velvety below, very veiny, very closely and sharply serrate with teeth 1 mm. long. Heads terminal in compound cymes on filiform peduncles. Bracts soft, narrowly oblong, green but whitened by pubescence, barely acute, thin. Akenes oblong-obovate, very thinly winged above and ending in a lacerate crown and with 1-2 stout awns 2 mm. long Crown varying from none or to a ring or a real and terminal wing Akenes sparsely pubescent.

Sclerocarpus Triuntonis n. sp. No. 27717, Triunfo Oct. 6 1930. A weakly erect annual, branching above, with opposite, slender-petioled, thin, triangular-acuminate, coarsely serrate leaves, about 3 inches long, finely pubescent with appressed hairs. Heads few, cymose on slender petioles, yellow. Involucral scales about 6 ovate and stalked, green, spreading, ashy with fine and appressed pubescence. Disk scales spatulate and with whitish tips very pubescent and long-ciliate, short. Rays deltoid, yellow, ¾ inch long, on a long and filiform stalk, pubescent without. Ray akenes obliquely obovate, about 3 mm. long warty and pilose, nearly round in cross section. Stamens separate, linear, black but yellow-tipped. The plant has the general appearance of Verbesina encelioides. Sclerocarpus spatulatus Rose Cont. Nat. Herb. Vol. I 103 is so poorly described that it cannot be identified.

Franseria acerifolia n. sp. No. 27765, Cayuca ranch, Oct. 23 and Arroyo Undo, No. 27764, Oct 26 1930. A slender shrub erect and openly branched above but not rigid, 6-8 ft. high, paniculately branched above and with the slender branches ending in ovate panicles not over 1 ft. long, the involucres rotate and with 8-10 bracts shorter than the heads and strigose. Fertile flowers few, woolly, with about 10 light-yellow, slender and hooked spines Stems, petioles, and midribs densely and very shortly rough-pubescent with whitish hairs, the lower sides of leaves with similar but less dense pubescence; the upper sides papillose with sharp warts. Leaves ovate in outline, not over 1 ft. long, on stout petioles rarely 1 inch long, alternate, pinnately 7-9-lobed to below the middle, with the lower 1-2 pairs of leaflets much reduced, all lobes triangular-acuminate and irregularly and sharply serrate, the terminal leaflet much the longest. Flowers yellow. Heads on capillary peduncles.

Sanvitalia longepedunculata n. sp. Nos. 27761 and 27729, La Barranca, Guadalajara Nov. 19 1930. An erect and widely branched annual. Leaves ovate, inclined to be acuminate at both ends, sparsely crenate-serrate, on short petioles, 2-3 inches long, thin. Inflorescence of few filiform peduncles 2-3 inches long and cymose. Heads ovate, with conical receptacle. Rays none. Disk flowers very many, whitish. Chaff on receptacle papery, embracing akenes and hyaline-margined. Akenes flat, thin, with surface smooth, narrowly winged on the margins and long-pilose there with ascending hairs, emarginate, with a low crown and single and capillary awn on the corners. A weed in fields.

Sanvitalia Aberti Gray, Dragoon pass, Ariz., Sept. 24 1931 has involucral bracts scarcely distinguishable from the chaff, but thin and hyaline-edged.

Zinnia barrancæ n. sp. No. 27698, La Barranca Guadalajara, Nov. 17 1930. Tall and erect, 3 ft. or more high, with the simple stems puberulent. Leaves pustulate-acerose on both sides, 3-5 inches long by 2 3 wide, oblong-lanceolate, shortly acuminate, rough-veined below, minutely crenulate. Flowers in terminal and cymose heads, the central head bracteate. Peduncles 4-6 inches long and stout. Heads 1 cm. long and wide, grayish with white pubescence in lines. Bracts ovate, 6-8 mm. long, acute, closely appressed, the inner series with greenish expanded and reflexed tips. Rays red-orange, 1 cm. long, spreading. Akenes flat, deeply notched, with tips acuminate into rigid awns upwardly ciliate, 4 mm, long, the awns about 2 mm. long. Ray akenes triquetrous and sharply winged and with shorter awns.

Palafoxia linearis **var gigantea. n var.** Sand dunes west of Yuma Sept. 26 1931. Plants 3-6 ft. high, erect, single. Leaves 4 inches long by ¾ inch wide, linear-lanceolate and acuminate, flat, shining on upper side. Heads 1.5 inches long, large, with pappus almost wholly exserted and ⅓ the whole, with the outer scales almost destitute of hyaline margins and all ending in needle tips. Stems striate. This has been referred to the species but is a well-marked variety, very robust but not shrubby.

P. leucophylla Gray seems to be the same as P. arenaria Bdg I see no use in kedping up Polypteris

Lagophylla scabrella (Jepson), Hemizonia truncata var scabrella Jepson. A slender, erect and glabrous annual, dichotomously branched above into an open and almost capillary panicle. Leaves linear, 2-3 inches long by 2-3 mm. wide, acute, entire, rigid, sessile. gradually reduced above and often with a single tack shaped gland at tip. Whole plant perfectly smooth and with reddish branches. Heads solitary on capillary and bracted pedicels, oval, about ½ inch long, bright-green. Fertile akenes 3-5, embraced by the boat-shaped, green and smooth scale which has a long and cobwebby fringe of white hairs on the inner margin, the akenes being obovate, obcompressed and arcuate, rounded and epappose, black and smooth. Flower with 3 rigid, yellow rays, 3-6 mm. long. Disk flowers white or pinkish, epappose, the ray flowers seem imbricated. Plants 2-3 ft. high. Pitt river bridge, Cal.

Galinsoga Ruiz and Pav. Whether there is more than the one species here I do not know. The ray flowers are white and very short; the pappus is of several oblong scales variously lacerate and pointed. My species, sphærocephala exaristate, is epappose, but otherwise as in G. parviflora and has linear or very narrow leaves

Cosmos sulphureus Cav., No. 27752, La Barranca, Guadalajara Nov. 16 1930. Erect plants, branching above and ending in single large and pedunculate heads, on peduncles often a foot long Plants almost smooth. Leaves lanceolate to ovate, bipinnate into narrowly oblong segments which are acute and acerose. Petioles beset with long, tapering, flat hairs, with midribs having scattered and spreading and short ones. Heade in flower 1 inch long and in fruit 2 inches long, with conspicuous orange rays 1 inch long. Flowers about 15. Akenes about 25 mm. long, linear-fusiform, tapering below the middle into a filiform beak nearly 15 mm. long which is scabrous, the body of akene roughened with the sub-pustulate bases of nascent hairs, the rudimentary hairs of beak are ascending, but hairs of the 2 short and subulate awns are downwardly barbed at tips. This species is close to Bidens Bigelovii and bipinnata, both having rudimentary beaks. The heads have several bracts among the akenes, a Bidens habit at times.

Bebbia filifolia n. sp. No. 27783, Cayuca ranch, Oct. 23 1930. A tall shrub, not spinose, with filiform leaves, 3-5-parted and 3-4 inches long. Involucral leaves oval, lacerate, 2-5 mm. long, only the innermost linear and acutish. Heads short-pedunculed. Branches many, as in Bigelovia, and shrubby below.

Elephantopus spicatus is the correct name for my No 23346 of my 1928 collection.

Cacalia coriacea n. sp., Orendain, Nov. 28 1930. On prairies. Plants coarse, 3-4 ft. high and erect from a thick root. Leaves rosulate, very, thick, leathery, venose, smooth, laciniately cut into 6-7 broad, cut, and sharply toothed lobes, and with petiole winged above. Leaves a foot or more long and wide, with rounded sinus or cordate, the lower pair of lobes with 4-6 parallel nerves, inclined to be erect on petioles as long as the blades and which are a little chestnut-woolly below at the slightly enlarged base. Stem leaves 3-5, somewhat clasping with sheaths 2-3 inches long, abruptly tipped by a sharply and spinulosely cleft and linear end 1-2 inches long which passes into similar spinulosely serrate outer bracts. Proper bracts about 1 cm. long, equal, convex, broadly eliptical, inclined to be lighter colored, faintly many-nerved, smooth, a little lacerate on the margins and with tips dissected into a tuft of hairs about as long as the white pappus, in 2 rows. Heads fully $\frac{1}{2}$ inch wide and high, very many flowered. Lobes of corolla very long, linear. Pappus almost plumose. It recalls the compass plant, Silphium laciniatum.

Zexmenia microcephala Humb. 27788 Orendain.

Zexmenia Seemani Gray is my No. 23412 of my 1928 collection

Zexmenia pustulata n. sp. Northwestern Mexico 1930. Erect herbs 3-4 ft. high, few-branched above. Leaves opposite, ovate-lanceolate, nearly sessile, 2-4 inches long, entire, or very obscurely serrate, rugose below and apparently densely pustulate above and minutely pubescent beneath. Stems low-winged on the angles, oppositely and shortly branched above. Heads few, in irregular cymes; the central ones nearly sessile; the lateral ones variously long-rayed on stout peduncles 1-2 inches long. Heads yellow, $\frac{1}{2}$ inch wide, nearly spherical, with the yellow linear rays about as long. Bracts succes-ively shorter outward but not in ranks, with tips reflexed, thick, green, rounded, very roughened gradually passing into hyaline, obovate, slightly lacerate, yellowish, thin inner bracts which in turn pass into the conduplicate, variously lacerate scales subtending the black akenes which are obovate-lanceolate, smooth, slightly nerved, very thinly winged at least above, the wings terminating on the angles of the rather rugate akenes in a raised area and then jointed to a subulate awn as long as the akene at each angle, but with no accessory pappus. The center of the end of the akene is produced into a false neck to which the corolla is jointed in a bulbous enlargement which contracts abruptly to a real neck 1 mm. long and then expands into the usual Helianthus flower. Corolla puberulent. Stamen tube not black. Ray akenes not as winged as disk ones. General appearance like Silphium perfoliatum.

Dysodia fimbriata n. sp. No. 27784 La Barranca, Guadalajara Nov. 16 1930. This would come under Rydberg's proposed genus Clomenocoma Cass. Erect and tufted from a perennial root, conspicuously corymbosely branched above, striately angled. Leaves sessile, green, 1-2 inches long, fimbriately pinnate almost to midrib with nearly linear segments rather broader above and very deeply cut and ending in long and flexible setæ or hairs. Stems branching at tips into several filiform peduncles 3-5 inches long, and bracted and ending in single heads. Involucres 1 cm. long, obconic, of nearly distinct and dotted scales (leaves not glandular-dotted) and several accessory outer and green bracts dissected into long setæ. Rays fertile, saffron-yellow, 1 cm. long, oval. Akenes linear, finely 15-ribbed, about smooth, truncate at tip, with about 5 inner pappus scales dissected nearly to base into 5 or more unequal setæ, and with 5 spatulate outer scales ½ mm. long Pappus much as in D. Cooperi but the truncate scales absent in Cooperi. General aspect of plant that of Aplopappus spinulosus.

Porophyllum rotunditolium n. sp., No. 27777a, Orendain, Nov. 27 1930. Whole plant green, rather shrubby below 3-4 ft. high, erect, branching from the upper axils, with the slender branches divided and about 6 inches long and ending in subumbellate clusters of 3-10 heads on filiform and minutely bracted pedicels 1-2 cm. long. Heads rather cuneate, 1-1.5 cm long, the 5-6 scales about 1 cm. long and each with 2-3 narrowly oblong and large glands. Akenes about 6 mm. long, linear but some tapered above, pubescent, faintly yellow-ribbed. Pappus plumose, nearly as long as akene, Leaves oval, 2 inches long, venose, palmately veined below, smooth, upper ones reduced and inclined to obovate and about 1 cm. long. Inflorescence conspicuously leafy On prairies.

Porophyllum purpureum n. sp. No. 27777, La Barranca Guadalajara, Nov. 21 1930. An erect shrub about 5 ft. high, corymbosely branched above, smooth throughout except the upwardly pilose akenes. Leaves coriaceous, elliptical, obtusish entire, 1-2 inches long by 1.5 wide, on stout petioles a fifth as long as blades, somewhat reduced above, but never to bracts. Heads few at the ends of filiform final branches, in cymes. Peduncles 1 inch long, filiform and with knots at the ends, the heads early deciduous. Heads 12-14 mm. long and 2 mm. wide, few-flowered. Akenes black, finely striate, very shortly hairy, obscurely contracted at very tip. Pappus a little over half as long as akene, sordid, scabrous. Rarely the lower leaves become 1 inch wide. There several allied species but none very near. This has the general character of the above but pappus only scabrous, leaves quite different, and flowers of that are greenish; the bracts of the two have similar oil-glands

Porophyllum nodosum n. sp. No. 22684 Nov. 15 1926, La Paz. Leaves simple, filiform, nodose, 1-2 inches long. Heads widely panicled, on filiform peduncles. Plants 2-3 ft. high. Flowers less than 10 to a head. Pappus a little tawny. Akenes scabrous, with beak 1 mm. long. Scales linear, 1-5 mm. long, the inner with hyaline margins.

Encelia anomala n. sp., No. 27716, Arroyo Unlo Oct. 25 1930. Annual, erect, 2-3 ft, high, widely branched throughout, with leaves opposite and stems slender. Leaves very rough with stiff, short and appressed hairs, inclined to be triangular-hastate to broadly ovate, with few coarse and ascending sharp teeth, acuminate, with base cuneate into a slender and low-winged petiole ½-1 inch long. Hairs with pustulate base, acuminate, with upper side of leves less pubescent. Stems elongated. Peduncles and involucral baracts conspicuously striate. Bracts flat, rounded and oblong-oval, 6-8 mm. long, appressed, almost in 2 rows, shaggy-hairy above, about 12. Receptacle conical. Chaff very thin and hyaline, truncate, 3-nerved, smooth and shining, twice as long as akene, and with tips inclined to be purple or green. Corolla tube broadly linear, with lobes triangular and greenish, and stamen tube black. Akenes broadly linear, squarish when mature and with strong midrib, 3-4 mm. long, 1 mm. wide, a little wider above, high-warty all over when mature, smooth. Peduncles 4-6 inches long, single. Rays persistent, rather rigid, golden-yellow, emarginate, broad, ½--¾ inch long, about 10, fertile. This has the habit of Verbesina encelioides but more bracts and no wings on akenes. It grows around corralls.

Bidens Orendainæ n. sp. No. 27770, Orendain, Nov. 27 1930. on bottoms in fields. Leaves regularly 3-5-pinnatifid into narrowly lanceolate, long-acuminate divisions, with appressed, regular and very sharp teeth evenly spaced. Heads about ½ cm. wide. Outer bracts almost filiform. Akenes linear-acuminate, but scarcely beaked, 1 cm. long, hispid and sharply warty above, the ray ones appearing wider, tips with a few flattish scales or hairs and no warts. This seems to verge toward Cosmos. Several species of Bidens show a tendency to diverse akenes with warty sides or backs leaning toward Heterospermum.

Bidens barrancae n. sp. No. 27757, La Barranca Guadalajara, Nov. 23 1930. A weak and much branched annual, 1-2 ft. high, with almost bipinnate leaves with the lanceolate and incised segments acuminate, 2-3 inches long, very thin, opposite, on a petiole 1 cm. long. Upper leaves simple, 3-lobed, linear-elliptical, 1-2 inches long. Heads few, cymose, on filiform pedicels 2-3 inches long. Heads 5 mm. wide, oblately spherical. Outer bracts linear, ciliate. Rays about 1 cm. long, white, and yellow veined, cuneate-obovate, several notched. Akenes linear, not 1 cm. long, 4-angled, smooth. Awns 1 to 2 mm. long, yellow, Plant with the habit of Coreopsis parthenioides but near B. bipinnata, a conspicuous field weed.

Stephanomeria Mexiae n. sp. No. 2506a, Baruschi north of Minaco Chihuahua Mex., in dry washes. Flowers purple Plants 1 to 2 ft. high, erect from an erect and tnberous root, inclined to be woody below, with several simple stems fromthe root. Leaves rosulate below, linear-oblanceolate, gash-toothed, floccose-woolly with deciduous wool. Stem leaves linear, not over 1 inch long, entire, reduced above to very small bracts. Plants racemosely branched above, with few large heads on slender peduncles. Bracts at base of heads linear; involucral ones 6 to 10 mm. long, smooth, hyaline on the margins. Stamen tube elongated, hyaline. Styles black or dark red. Pappus plumose to base, not chaffy below. Akenes linear, truncate, smooth. Styles linear and quite broad and yellow.

Tithonia tubæformis Cass. No. 27705, La Barranca Guadalajara, Nov. 23 1930. Plants annual and with the habit of Helianthus annuus and possessing the cultivated fields in the same way, 4-6 ft. high, racemosely branched and ending in single, large and long-peduncled heads. Leaves ovate to triangular-ovate, acuminate, coarse, 3-nerved, on stout petioles about 1 cm. long, somewhat margined. Leaves crenulate, ashy with short white hairs from a pustulate base, darker above, with the young parts silvery-silky with fine white hairs 5 mm. long. Heads 1-1.5 mm. wide, and wider than high with convex receptacle. Proper bracts in a single series, or with an intermediate series of narrower ones within which are not acerose as are the disk ones, all bracts strongly many-ribbed, oblong, 1 cm. long, acutish, appressed except at very tips, ashy-hairy as are the leaves, but pubescence longer. Chaff on receptacle linear, convex, nearly smooth, acuminate into a very stout and spinose beak 2 mm. longer than the flowers. Rays 1-2 inches long, light-yellow, about 1 cm. wide, veined, from abortive, flat, and slightly winged ovaries, and without pappus, and smooth except for some cobwebby hairs. Disk akenes black, smooth, angled truncate, linear, about as long as corollas, crowned by a row of minute and lacerate scales, and often with 4 awns from winged bases, but very deciduous.

Bidens pedata Brandg. No. 27779. On trail down the Laguna on cliffs. Sept. 24 1930. A tufted and erect shrub 2 ft. high, with innumerable filiform, dissected and smooth leaves 2-3 inches long. Stems produced into long and peduncle-like and simple floral peduncles about a foot long, ending in 1-2 rudimentary leaves and a few cymosely arranged heads on filiform pedicels 1-2 inches long Heads ½ inch wide, with few short orange rays. Akenes with 2 coarsely and retrorsely barbed awns and no crown. Not at all fleshy. It belongs in the Seemani group.

Aspilia grosseserrata n. sp. No. 27773, La Barranca Guadalajara, Nov. 17 1930. Near A. xylopoda Greenman. Course and ereet from a rather woody root, racemosely branched above into slender and similarly branched laterals ending in filiform peduncles with narrow bracts, Leaves ovate-lanceolate-acuminate, 3-5 inches long, 3-nerved above the base. very rough with minute and raised papillæ which on the nerves end in long and very slender white hairs Stems and petioles white-hairy. Leaves incisely and remotely serrate, and the teeth below sometimes becoming almost lobes; the lower part of leaves narrowed into a very wide and rather eared and sessile base. Upper leaves reduced to nearly linear bracts. Involucral scales in a single series, but the outer row irregular in length and all likethe leaves in pubescence, then gradually passing into the bracts of the receptacle which are hyaline except for a green midrib; these bracts closely embrace the akenes which are flat and apparently wingless and upwardly puberulent but rather hairy on the margins and linear and truncate at tip, and on the angles have single and subulate awns flaring at base and then turning up and nearly as long as the corollas of the disk flowers. Ray flowers sterile and the abortive akenes smooth and without pappus. Rays nearly 1 inch long aad obovate and purple, with the corollas abruptly contracted 2 mm. above the base. Crolla lobes sparsely pubescent with long white hairs. This does not seem to be any of the known species, but they are very diverse.

Bidens anthemoides (DC.) Sherff. The Laguna Sept 22 1930. Nos 27778 and 27767. Growing in sandy places, a weak and widely branched annual, erect, 1-2 ft. high, nearly smooth, with conspicuous yellow flowers. Leaves about 2 inches long, opposite, petioled, palmately compound and with the secondary divisions pinnately dissected. Flowers cymosely arranged on long peduncles, 3-6 inches long. Heads about 1 cm. long and wide, with double involucre. Outer bracts linear, green and thin and nearly as long as the inner, tapering but obtusish, in one series: the inner bracts twice as wide and about 1 mm. wide, linear, purple rather convex, narrowly white-margined, narrowed toward tip and rounded there and with woolly margins. These pass into narrower bracts subtending the akenes. Rays entire, dark-striped, elliptical, 1 cm. long, 3 mm. wide, fertile, their akenes almost linear but larger above and rounded at tip and smooth, awnless, several-nerved on the inside and 1-nerved on the outside, lenticular in cross-section, black, about 3 mm. long. The next series (disk) akenes has a row of narrowly linear akenes sometimes fertile that are covered with spiny warts, no wings, and with 3 stout and subulate persistent awns nearly as long as akenes. The inner rows of akenes are mostly sterile but narrowly 5-winged and smooth. This has the appearance of a Bidens but the ray akenes make it a Heterospermum.

Sanvitalia Aberti Gray. No. 23612 Dragoon pass Ariz., Sept 1931. Involucral bracts scarcely distinguishable from the chaff on receptacle, but thin and hyaline-edged, green-tipped and green-striate, as long as chaff. Chaff very rigid, sharp, linear. convex, greenish-white, 6-8 mm. long, erect, with sunken green grooves as if ribs, subtending the disk akenes but not the ray ones. Rays ovate, rigid, leathery, convex in cross-section, 3-4mm. long, yellow inside and light-colored on the outside, and with many green ribs, grown to the thick and obpyramidal akene which is triquetrous and 4 mm. long and ½ as wide at tip and truncate and 7-10-striate with green and sunken ribs, with 2 horns on the outside of the awns, the raised area included inclined to be corrugated. Disk akenes oblong but a little wider above, somewhat flattened and 7-grooved, black, warty on the ribs and with no pappus. Disk flowers small and greenish. It has the habit of a low Heliomeris. Robust specimens from Rustler's Park have rays 1 inch long, the leaves lanceolate and strongly toothed, obtuse, Zinnia-like.

Hutchinsonia hyalina n. gen et sp. Plants belong to the Polypteris section of Compositæ and apparently allied to Hymenopappus. Erect perennials, somewhat woody below, corymbosely branched above and with clusters of 6-8 heads in loose corymbs the heads on filiform peduncles with linear and smooth bracts. Leaves many, pinnately dissected into linear segments, 1-2 inches long, minutely hairy, gradually reduced above to linear bracts. Heads white, rayless, without chaff, with 10-20 flowers. ½ inch high. Bracts oblong, rounded, hyaline, lacerate at tip, free, in 1 series, ashy, not embracing the black akenes which are truncate at tip and 5-angled or -ribbed, puberulent, linear. Corolla tube broadly oblong, contracted below a bulbous enlargement and then reduced to a tube, its lobes triangular and erect. Pappus of 5 linear, hyaline, pubescent scales with 1-3 strong ribs ending in plumose awns.

Named for Mrs Susan W Hutchinson who was with me in Aaizona in 1931 and who collected this at Peach Springs in 1932

Field Notes of Mexican Trip, 1930.

I went to San Jose del Cabo, 14 miles east of Cape St. Lucas and reached there Sept. 14., landing in the surf since there is no wharf, from the steamer Jeannette. Vegetation very dry, and only lowland stuff any good. Rambled out to river and got some stuff. On the 15th. went to the beach, 3 miles by the road, and got more material. Bambos vulgaris is common in low places. There is one big clump of B. aculeata. Saw one tall tree of Attalia Cohun near beach, cult. probably, a fine tree with smooth white bark. Dates are all yellow now. Grapes are full size but green. Bananas green. Pomegranates ripening. Washingtonia fronds fruits more common than with us and ripe or nearly so on plaza. Did not notice any Erythea. Cocoanuts frequent. Sugar cane not yet ready to cut though edible. Got a Potamogeton like Zannichellia in habit in the freshwater pond at the beach, also a brittle Chara. There is a plant with habit of Veronica (Seymeria) creeping and rooting in the mud, but in the water is erect when submerged. Jouvea pilosa, the type of Vasey's new genus, is dioecious, and with very pungent leaves that stock will not eat, is in mounds at the storm line and helps make sand dunes, The flame tree that I got at Los Mochis in 1926 is here with fiery-red flowers in big clusters. There is a petaiya (C. Thurberi Eng.) here but no cardon (Pringlei) in sight so far. The white fig is cultivated and so are grapes and guavas. There is a beautiful shrub here that ends in a vine, Apocynaceous, with large blue-purple flowers. Cultivated fields are lousy with Euphorbias. There is a fleshy-rooted Abronia on the sand dunes of the shore, maritima, with purple flowers and is prostrate. There is a Calliandra-like large tree, Albizzia ? cultivated for shade. There is a large fig tree like Palmeri with shiny elliptical leaves and buttressed trunk and snake-like roots, Palmeri has aerial roots like the banyan. It is 50 ft. high and looks as if it might grow on rocks like Palmeri. There are many trees of Populus Fremonti common along the bottoms along with Salix Bonplandiana and Baccharis viminea. Both species of Philibertia cover bushes to 20 ft. high. The flowers of Cereus gummosus, the edible petaiya, are white, open in sunlight, 5 inches long. by 3-4 inches wide, purplish on the outside, with tube 4-5 inches long; fruit nearly globose and 1-3 inches wide, sparsely spinose with deciduous prickles and full of blood-red (venous) pulp and small black seeds, and very juicy. It blooms sporadically now. Cereus Pringlei, the cardon, is scarce on the hills but Thurberi is less common than the horrid gummosus. Echinocactus Falconeri is frequent and with spines flat, cross-ringed and normally hooked, with the lateral ones thread-like and many and no wool. There is a little Mamillaria here which grows in small clumps, apparently the same species that I saw all over.

Also there is the big-teated one (M. Poselgeri Hilldmann) that I found first in big clumps at La Paz, it has the spines of Echinocactus and was referred to Cochemiea by Rose and is M. Roseana Brandegee. There is a Cylindropuntia with the sheathed spines and the habit of prolifera, everywhere, with black rudimentary flowers that I have called O. abortiva, which proliferates the ovaries several times though there are mature seeds in them. There is another that simulates Cereus Emoryi but with smaller yellow joints. There is a Platopuntia with yellow joints also. There is an openly branched shrub, like Tetracoccus (Jatropha spathlata). There is a lizard, 1-2 ft. long, with long aud tapering tail which is blotched with gray all over and without the yellow neck-ring of our tiger lizard though equally swift. Saw a jackrabbit. Temperature at noon is 90 degrees plus, humidity 80 % Things dry slowly. I hear a California quail calling. Buzzards are common but I see few other birds. Got two snails like the n. sp. I got 2 years ago under rocks, but these on the shady side of bushes up in the air 2 ft., resting period.

Todos Santos. I stayed at Cabo 4 days, then came here by auto, 65 miles. Road fair but bumpy, unimproved from a wagon road, much up and down and sharp curves. There is more cardon as you go north, also C. Thurberi. Yucca valida Brandg. is more common and up to 10 ft. high, just coming into bloom. with panicle sessile, ovate, 1.5 ft. long though rarely 3 ft.; flowers white, pear-shaped in bud, rotate in bloom and with tips incurved and petals oblong-oval, obtuse; flowers drooping: panicles erect, very many-flowered. with each flowør about 1 inch long and same shape as in Treculiana but not over half as large, seemingly uniform. Leaves very pungent, sharp on the edges (minutely-serrate) and without threads mostly, thin. $\frac{1}{8}$ to one sixteenth inch thick, rather flabby, quite concave and erect, reflexed in age, narrowed above the insertion, taper-pointed, blue, with black-spiny tips. The mango is ovate and with oblique termination, smooth and shining, about 4 inches long, with yellow and very juicy pulp and not so stringy as usual. It hangs in small bunches from the ends of twigs. The avocado is gourd-shaped, and shining, not warty like ours, and hangs from a long peduncle, and when ripe is soft and easily eaten with a spoon, and not so utterly worthless as the hard and green ones we are accustomed to at home.

Todos Santos. My object here was to ascend the very difficult Laguna mts. from the western and easier side and collect the summit flora. To do this I had to have pack animals and a reliable guide and packer. Being a stranger, I went to a friend G. W. Pickett who was running a gold mine at Pescadero, a few miles away, to recommend a suitable outfit, giving him full authority to secure it. He sent Alvarado, his wood foreman, an old man of fifty years, a very capable person who did not know the trails

but was reliable. So the next day he came with 5 mules and said he would take me up for 10 pesos a day, I to pay for feed and grub which was very reasonable, $5 a day. I will leave the details of this terrible trip to a private letter written to a friend on the way back:

Pelota Ranch, at foot of
Laguna mts. L. Cal.
Sept. 24 1930

Dear Midge;

Well, I have seen the "enemy" and he is mine. I am now about 20 miles east of Todos Santos, just beyond the "Ultima Thule" of the Ancients, on my way back.

I reached the Cape Sept. 13th. Had to pay 30 pesos duty on my driers because the fool custom official could not find the proper classification for my cardboard driers, and so he soaked me six times their value the tax on writing paper, as duty. Then my host who kept the hotel where I was driven from the boat soaked me 5 pesos a day for room and meals. Then I hired an auto to take me to Todos Santos, 65 miles for 40 pesos. There I went to the same hotel where I stopped before and the two old maids who ran it remembered me and agreed to keep me for 2 pesos a day. It was three days till I got a Mexican to take me to the top of the Lagunas for 10 pesos a day, with 3 pack mules and saddle animals. Next a. m. we started and I had Purgatory riding but not so bad as I expected. We got 16 miles by noon to the Cota ranch and then 4 miles farther to the Borego ranch 4 miles below here. We slept out but they fed us, 4 meals, 2 pesos. Next day my moso got 2 young men from here to go along and show us the way and cut out the brush from the trail so that it would not strip the packs off the mules on the way. My ! But it was a terrific trip, right up all the time, often so steep the mules almost fell back making it, in fact one mule did fall over backards and rolled down endwise once and sidewise twice. When I saw his tail and legs flopping in the air I said to myself " The jig is up", but we all got hold of the mule and lifted him on his feet and he was unhurt but the moso would not repack him and put his pack on his saddle mule and footed it the rest of the way, abandoning the mule presumably to be eaten later on by the gatos grandes (panthers). Had to get off and walk much. Got very hot and drank water like a fish. Had to stop often to cool off. By noon got up to 4000 ft. alt. and stopped under the first liveoak tree for lunch and to rest the animals. The men went down in the gulch after water at the only water on the trail. After an hour we saddled up and climbed the rest of the day till 5 p. m. when we got to the top, 7800 ft. alt. Then down again a mile or two to a little grassy meadow called Laguna Chica. I wanted to camp here, but the boys said to go on to the real Laguna which is a big laguna,

BOREGO RANCH

PRIMIERA RANCH, SIERRA GIGANTA

S. B. PARISH

PELOTA RANCH, LAGUNAS

2 miles long by ½ wide, and surrounded by the low rim of the crest. Here we camped under an old apple tree full of hard and ripe apples, tough but eatable, there was a ranch there once, but abandoned long ago to the gatos grandes which killed their stock.

The range from 4000 ft. up is covered by liveoaks and Pinus cembroides, The Laguna was not there but very fine water was running in a stream near by. Well ! Our animals were about all in, only able to stagger along like ourselves when we got there, but soon were greedily feeding on the rich grass, all but the poor white mule we abandoned so hastily. There were flowers everywhere (see photo of Outfit in Lagunas with masses of Sphacele in foreground.) Next day I began and worked very hard all day and getting a great stack of stuff. The men went hunting before dawn, with my automatic 22 rifle, but got nothing. It was so cold at night at the 6000 ft. alt. that we nearly froze. The boys left us at noon and charged me only 5 pesos for piloting us up, a very reasonable sum. My moso was deathly afraid of the big cats but I knew they are too cowardly to attack humans, had they been the leopardlike jaguars, not known on the peninsula, it might have been different. Each night was colder than the one before. After 2 days I had got the whole flora and told the moso we would return in the morning. So we were up early and off. I wanted to stop at Laguna Chica but when we reached it I saw I had all its flowers, and so we did not stop. Going up the faint trail through the weeds I lost it for I was afoot, botanizing along and fiddled around quite a time trying to find it, and yelled a lot and finally the moso heard me and came running back, frightened and so I knew where the trail was. After that he kept nearer me Then came the terrible descent from 7800 to 1700 ft. alt. It was a frightful thing to walk a little too fast on the hot ground, down eternally down the loose granite trail, the moso impatient to get down, mules walking almost on end, but no accident happened though cinches had to be tightened or loads readjusted. By and by my feet felt blistered and as if with pebbles in my shoes, and I poked along in agony, being too sore to ride. I had to lie down in the shade to cool off from the intense heat. I drank water like a fish and almost dripped sweat. By 1 p.m. we got to the tree where we lunched going up. It was the last of the liveoaks. Getting there I almost played out and would have done so if I had not saved my strength by resting often. I laid down under a tree not knowing we were so near water when the moso came back with water. Mine had been gone a long time. So I drank and went on down to the tree where I peeled off my coat and vest. My shirt was sopping wet, and I tried to cool off a bit and dry out. By and by he saddled up and I saw we had the old mule, and I spoke of it. He said he found him at the waterhole. So we con-

gratulated ourselves. Then more down over the worse trail, in the blistering heat before an oncoming storm, which did not reach us but looked threatening. Then I tried riding till my kidneys gave out because of the constant backward bending, then I had to get off and walk on my sore feet, but it was slow going but I made it. The moso was crazy to get down and kept yelling at me to hurry, but I could go only so fast which was very slow. finally after much agony I reached the beautiful waterhole on the river and stretched out on a rock to rest. There is no water in the river except where the bedrock forces the seeping water to the surface in waterholes. I wanted to rest half an hour but the moso wanted to hurry on. So in 20 minutes we mounted and hurried on a fast walk to here, arriving in an hour. Then I decided to stay over night though they had only barbecued fresh beef to feed us. My! But I was tired. After a while I laid my bedding down in the dirt, and as soon as it was dark pulled off my pants and rolled them up for a pillow. Then the pigs, as it got cool, came in and crawled up my leg under the bedding to keep warm. Then the dogs would bark furiously and the pigs would scurry off to return later, snuggling up to a leg again. Then the two dogs growl at eachother over the best place at my side till they settled down. Then all would be quiet till one of them started the next stampede. At last I lost consciousness and did not wake up till dawn today. The rancher feared panthers were prowling around after a little colt he had. The sun has not yet got over the crest of the range. Well I am the first botanist ever to go up the Lagunas from the western side, and ought to be the last. It is Hell all the way up and Hell all the way down. No trail in California approaches it for pure cussedness, but I made it up there and got what I went for. I found a most unique grass dont even know the genus (Paspalum tenuissimum Jones), also a Carex of the filifolia group, (C. longissima Jones). Then I got a Populus, should be tremuloides but is not, may be monticola. I got a strange Œnothera, a shrub with 20 stamens (Helianthemum glomeratum). Well! It would take too long to recount them all but I combed the hills and vales for everything from lichens and fungi to Compositæ, and will get home today. Will take me a day to get my stuff all drying. Will soon be ready to start. Will take a photo of the place to show you (See cut). For pure squalor this is a peach, about like the old cave-dwellers. They charged me a peso for eats. Their guns are all pump guns with bore all rusted up. It is a wonder they will shoot at all.

Got off at 9.15 and reached here, Borego ranch, in an hour. We will stay here the rest of the day so that I can collect some shrubs and examine a pretty box canon here where they get water. We stopped here going up. It is intensely hot but endurable.

The whole country rock is granite, except here and there is some quartzite. The mts. are all steep and all covered by brush, 10-20 ft. high, most of the vegetation Leguminosæ, shrubs and small trees, plus Jatropha species, Bursera the copal trees, the cardon (Cereus Pringlei), and C. Thurberi, no true petaiya yet. The buzzards and a big white-rumped hawk(may be the condor) are common. Saw no squirrels nor chipmunks though gophers were many at the Laguna. There was a very tame humming bird feeding on the acres of Sphacele which cover the ground in great patches, as does Veratrum in Utah. The birds were very many. Never saw anything like them before. Bill black to middle from tip, then red to head. Top of head from bill to crest a dense black, also throat, with a white stripe enlarging downward for ½ inch from the eye. Then comes a lighter collar, then came the belly orange to the tail tip, the back a bronze-green somewhat white-speckled: tail a dull orange; wings nearly black and longer than tail. It nested in the appletree.
Been out around and got a few things, but it is too dry here, very wilting-hot, will go down to the wash and call it a day. Feel very groggy. Will be glad to get home and have a little rest. This has been a very strenuous trip, even for a young man. My physical machinery is working all right and so I have no reason to think I am too old for this work as I suspected two years ago, but the "old machine" creaks a little in the joints and is a bit rusty. The moso up at the laguna made some tea for supper 3 times out of a Pectis or Tagetes that was good but too laxative. I took a $1.45 box of coffee extract from Claremont. Last night I told my moso to have the woman make us some coffee from it and so she took over half of it for 2 cups. It almost tanned my insides. One of the men just lassoed a rattlesnake and hung it up to strangle and it died in a few minutes. There are a few lizards up here, but little wild life. Got a brown Helix on a rock. 9 24 1930. Slept fairly well last night, but it was rather cold. Did not eat any supper due to my stomach being upset by the coffee. Will soon be on the last lap of the journey, and another half day of Hell. feeling fair for the trip of 20 miles.

The women do the milking, and they tie the legs and tails of the cows so that they cant kick or switch while being milked. My moso puts blinders on each mule when packihg him to prevent kicking. Even half savages are on to some tricks, but they dont know how to keep up machines nor tools. Had a good breakfast of fresh meat, coffee, tortillas, and milk.

Todos Santos. We were off at 8-30 a. m. Reached Cota ranch in 2 hours. Then down the intensely hot and gentle slope to the sea. Had to stop often to get off and walk (because of the agony of riding), or to drink from canteen. Once the moso ran ahead to stop the lead mule while I drank, but the mule bolted

into the brush and tore off part of his pack and loosened the rest so that it slipped and frightened the mule into kicking till it was all spilled off, then he bolted toward me, fearing a beating, so I caught him and spoke kindly to him and quieted him, then the moso came and led him back to be repacked, and without an oath nor raising his voice. He is a remarkable man of 50, does not smoke nor swear, wears leather sandles without stockings, has overall, shirt and sombrero, is married and with 9 children.
Well! We pegged along and at 2.30 got home. Everybody turned to greet us and were crazy to know about the gatos grandes and the trip, etc. So here ends the epic venture, the impossible!

Well! A dios'"

I have added parenthetical clauses to explain text.

Continuation of critical notes.

We left on the 20th. Humidity had been at saturation for 2 days. Reached the Cota ranch, 20 miles toward the mts. at 1500 ft. alt., in 4 hours. Humidity 55 %. Excessively hot and dry, was nearly finished by the heat though I had a helmit hat. Had to get off and walk 5 times on the way, and had to lie down in the sand 3 times to endure the heat, but got there at 1 p. m. Water was very short at the ranch at the waterhole. After an hour"s rest we rode on to the Borego ranch at 1700 ft. alt., humidity 42 %. The ranch is a few hundred yards up a side canon near a water seep in a box canon. We camped here. At the seep is a sterile grapevine (Arizonica?), Adiantum, Notholæna, and much Selaginella lepidophylla. I got a few interesting things here. The ranch consists of 2 shelters which we may euphemously call houses, consisting of a roof held up on 4 posts and thatched by a cover of Erythea palm leaves, and walled by a wattle of willows. Their beds are made of poles laid parallel on crosspieces set in crotches driven in the ground. Their tables were higher but similar. Their cooking outfit was like the table but lower and with a cover of dirt on which to make a fire. The floor was of dirt, on which chickens, pigs, dogs and goat kids played or fought. In front of and joining the house was the corral where they kept 10 calves which they released morning and night to suckle the cows as they came in from the hills. The women did the milking. They gave us supper and breakfast of tortillas, milk, and meat.

No palms are growing here. There were a few liveoaks at the Cota ranch and on the way here but none here, not those of the mountain. The mt. sides are covered with palo blanco Lysiloma candida and the like shrubs and trees. Also there was much Tecoma stans. It was not so hot in the p. m. The brush is a little taller here and thicker. Saw one cardon with fasciation (cancer) on the top. I saw a very few fruits of C. Thurberi which are like the petaiya (C. gummosus) but smaller and rarely 2 inches

wide. The flowers are like those of C. Pringlei but narrower and a little shorter, apparently very dark. Morning. Humidity 80% Barometer unchanged. There is a leguminous shrub or small tree here with a spray-like flat top and there are some big and dark-green trees with wide pods 6 inches long (Albizzia). Tecoma stans is common and in flower and fruit. Most of the brush here has very light-colored and smooth bark blotched and darker-brownish below, very few with rough bark, even on big trees. The big cardon and Thurberi still occur but scarcer, probably also the petaiya. The big candelabrum shrub with large white flowers (Thevetia) came in at the Cota ranch and is still here. They have Cotswold sheep and Angora goats here, and 20 long-horn cows with small bags and 18 calves. The sheep are long-tailed. The pigs are red. The white-banded pigeon is here, also the gray-breasted jay with long tail, and blue all over except the breast. There are few birds.

Next morning, the 21st., we followed up the dry riverbed, 6 miles to the Pelota ranch, a near counterpart of the cliff-dwellers' homes. Here we engaged two young men to go along as guides and to cut out the brush on the trail. We stopped for the noon rest under the first liveoak, at 3800 ft. alt., the beginning of the Lower Temperate lifezone, and at the first water on the trail. They unsaddled and went down in the steep gulch for water. Humidity 38%. Ocean breeze. Here a few new herbs came in. The granite trail was steep and as difficult as I ever was on anywhere, being only a deer trail, but at 4.30 we reached the Laguna all tired out so that we could hardly crawl along, after passing the beautiful "Chica Laguna", a mile back. As we neared the top liveoaks covered the region and herbs became quite tall under them, 2-3 ft. high. The elevation of the crest was 7800 ft., but the highest point in the range, a few miles farther north, must have been 8500 ft. or more. The accepted elevation is 6500 ft. which is altogether too low according to my accurate Tycho barometer. As we dropped down off the crest the trail vanished, but we made another. The exertion of climbing the mountain about finished the mules as well as us, but the mules soon were greedily grazing the rich grass. I wanted to camp at "Chica Laguna" because of the condition of the outfit, but the men urged going on to the real Laguna and so we dragged along through the timber and came out to a beautiful grassy plain hemmed in by the mountain rim, and to an old apple tree under which we unsaddled and the men were soon up in the tree munching the ripe fruit. It was an ideal place to camp where one could see all over the plain from the gently rising ground, not 50 yards from a little stream. We were soon eating our supper, but I was too fagged to botanize that night however tempting might be the great masses of Sphacele, acres of them all around.

The name "Laguna" means a pond, and was given because there is a pond in the southern end of the grassy plain where stock can water, there is forage everywhere but water is scarce. The Laguna is really a grassy plain like the oldtimes " Plains" of eastern plains of Colorado, and with the grama grass, Bouteloua oligostachya, the most common, plus Cyperus aristatus, Aristida, Muhlenbergia species, all bunch grasses, growing on the poor granite and porous soil. The mesa is an undulating plain 3 by ½ mile dimension, with a little pond at the far southern end full of weeds and with border of plain fringed by a forest of livecaks and Pinus cembroides continuing to the crest. My camp was 6000 ft. alt. and 1800 ft. lower than the crest. On our arrival we saw no stock but soon a burro came braying toward us, and later on we saw a band of horses and a few cattle. I turned in to bed early but the men sat around the fire till late visiting. The night was very cold to us accustomed to the Tropics and so the men were up before dawn getting warm at the fire. Then they borrowed my 22 automatic rifle to go deer hunting. Soon my moso came running back after more cartridges, saying they had shot a deer in the hear t but he got away. I made no comment on the stupidity of trying to kill a deer by shooting at his heart with a 22 but gave the desired ammunition.. Mexicans are poor shots, and the bigger the mark the more they like it. I was shooting with one recently when he shot at a cap box at 50 feet and missed it, firing from a rest, then I hit the bullseye offhand with a snapshot. If he had shot at the deer's head he might have got results.. As soon as I could get breakfast I was out among the flowers. There is much Erigeron Canadensis, some Lepidium medium, Verbena hastata, Gnaphalium Scouleri ? In the adjacent forest is a Madrona (Arizonica?). On the plain is Carex filifolia?, Cosmos, Cyperus aristatus, the Tuna. Among the trees is a Nolina 10 ft. high, glaucous-green with leaves 3 ft. long, ½ inch wide, tapering but pointless. There are a few young, small Erythea Brandegei Pinus cembroides is common and with the pinon cone but leaves very different. It is taller and more symmetrical. Humidity 60% Sphacele hastata grows here in great patches and is alive with hummingbirds. I took a walk down to the southern end, nearly 3 miles, it is very beautiful and has some running water above the pond which seems to end against a granite cliff nnder which it seeps. Got a great mass of specimens. In one place I found a new grape growing high, with clusters of ripe blue grapes. Near by on some rocks was the wild potato, Solanum Fendleri. A party of men came iu the afternoon with a band of horses, and my moso thought they were horse thieves.

The next day I completed botanizing, getting everything in bloom or fruit. Humidity 40 percent. Big cumulus clouds in the eastern sky soon brought a hard thunder scorm with much rain and lightning. Very hot and dry before the storm. I found

a unique new grass(Paspalum tenuissimum Jones) which Brandegee missed, growing everywhere on the plain, with filiform stems from an inch-wide tuft of leaves. I got 2 orchids, one with peltate leaves single from a tuberous root, growing in damp and shady places. Ferns were common in the forest, such as Adiantum Capillus-Veneris, Pellæa, Phegopteris, Cystopteris, Asplenium Trichomanes, also a big Aspidium, Lobelia Cotensis, also Valerianasorbifolia, seemingly annual because of the slender stems from corm-like roots. There is a peltate-leaved Hydrotyle?, common below, also 2 small lupines, Astragalus ervoides not yet in bloom but common and prostrate, 2 Desmodiums, a Mimosa, the Madrona, Salix Bonplandiana rare. Only a black oak(Q. devia) here. Pinus cembroides often is 4 ft. diameter here and 75 ft. high and not as opnely branched as the monophylla pinon. There are several cups cut in the trunks, indicating that people got turpentine or rosin from them once. There are evidences of long-time occupation but all old. Humidity 65%. Populus monticola is here along the creek, a true aspen, with white bark and is strict, 75 ft. high, horizontally branched and with rounded top, twigs tough, not brittle, leaves falling as if it were Fall, and wholly unlike any other Populus. Arracacia Brandegei here has the habit of Myrrhis and is commun in the timber, as is Osmorhiza at home and is 1-6 ft. high with a big tuberous root, erect: leaves often flat on the ground. Brunella is common on the creek.

Sept. 24th., 7-30 a.m. Wet and cold last night, everything wet. Mules look better: Moso packing up. Dogs barked some in the night: moso said it was because of the big cats, but nothing happened. and stock all right. Got off at 8-30 and reached our previous noon stop at 1 p. m., beastly hot, I walked all the way and had to stop often to rest in the shade of the liveoaks. clouding up at 2 p.m. and hot and still. Got a lot of things coming down, nearly played out, soon will be down to the river waterhole. Clothes sopping wet with sweat. Got to Pelota ranch by 5 p. m., dead tired, small of back feels broken and feet blistered. I walked so much that the balls of my feet felt as if there were pebbles under them though no sign of blisters showed. 2100 ft. alt. Cool breeze. The ranch house forms one side of a corral It consists of 2 shelters roofed with Erythea leaves though no trees of it now in sight, and walled in by poles 6 ft. by an inch dimension. Between the two shelters it is roofed but open on the sides. In the center is a table on 4 posts made of small parallel poles forming the top, such as I once made in the Wasatch, then a layer of dirt formed a hearth for an open fire on which they cooked. The man just took a piece out of a side of beef and barbecued it for us on the coals. It looks pretty well smoked up. Their cow just gave a pint of milk, the calf taking the rest. There are 3 little pigs, 4 dogs, 5 turkeys, a dozen chickens of all sizes under

foot. This is the primitive life of the old cave dwellers. There are 4 children , one idiot, 2 girls, 1 boy. The mother, about 20 and soon to have another. The dogs look half-starved. All animals are very tame. They have Cashmere goats and a young black-tail fawn, about a foot high. It is a cattle ranch on the edge of the brush. The man has several deer hides hanging up and one tanned buckskin. Morning. The folks talked late last night and the dogs barked much, apparently at panthers. The little pigs crawled to bed with me, insinuating close to my leg for warmth. I watched the stars march across the sky. Barometer reads 1750 now, evidentlly too high last night. People very pleasant but dirty and unshod.

10-30 a. m. Got to Borego ranch and will stay all day. They are cutting up a beef. Mules' backs are sore, mine least of all, from the down trip yesterday. Baby swinging in a panoche crate cradle and swung by a rawhide rope. 9 dogs here. The only weapon the men carry is a machete a kind of butcher knife, with which they cut brush and skin game. Everything is dirty. Two pigs, a few goats, a small band of sheep are here and some cattle. The Pelota spring is about $\frac{1}{4}$ mile up a side canon and seeps out from a vertical cliff and flows about 1 miner's inch. The one here forms a little waterhole and is rapidly drying up. Coming down there was a marked change in the flora at 4000 ft. where the oaks and Nolina stopped and and Bursera and Jatropha came in along with the cactus. My new grass and Carex stopped at 5000. Epicampes grandis also stopped. Humidity at that ranch at 7 p.m. 42% and this a.m. 75%. Season remarkably dry. It is hopelessly hot. One of the men just brought in a rattler and hung it up to strangle and without any show of feeling, just as my moso abandoned the old white mule on the way up. This seems cruel to me.

Sept. 25 Morning. Humidity now 78 percent. at 7 a.m. People very kind, slow cooks. There are 2 fully grown girls here, 3 married women and 2 children . Goats, kids, lambs, calves, chickens and turkeys all together under foot. The ground floor, dirt, is swept clean by splint broom.

Sept. 26, morning. Had a good breakfast of tortillas, meat. and coffee. Got off at 9 a.m. and went to Cota ranch and on to Todos Santos by 2-30 p.m. It was pretty hard on me to get off and walk from saddle soreness and thirst, and walked half the way but the result of the trip was just tiredness, nothing more. Moso figured I owed him 80 pesos, which I paid and was glad to get off at that. I consider myself fortunate in getting so good a moso as Alvarado, no doubt he would have refused to go had he known the difficulties. He is a man of fifty, gray, quiet spoken, all business, never swears nor smokes, rare qualities in a Mexican, is a crack packer and knows all about cinching up stock to keep packs on, is absolutely honest though he cannot read, wears sandals, overalls, hat and shirt.

CEREUS PRINGLEI VARIETY CALVUS

OUTFIT IN LAGUNAS

The fact that he took along no bedding showed caveman habits but he is a pretty fair sample of native man. When he came to settling up he was square and fair about it, making no attempt to gyp me, as most Mexicans would do. So one does not have to be civilized to be decent and honorable. He was accustomed to walking all day in sandals, never seeming to tire, and seldom had to drink water. On the contrary, I, an oldtime farmer boy, used to horseback riding, but 35 years out of practice was so soft that long riding was most excruciating agony to which I could not adjust myself, and so suffered intensely. So, when I got back to Todos Santos, I was about all in and very glad to slip off my mule, even if I had to tumble off. The women got busy at once with supper for us and everybody was glad that we had escaped the gatos grandes and back safe if not sound. It did feel good to come out of the blistering heat of the riverbed and below the Cota ranch and feel the cool ocean breeze. When we got to town the barometer read only 450 ft.. which is 150 ft. too high, and which is a remarkable performance for such changes in elevation as we made on the trip. At 400 ft. Quercus Brandegei came in, a large and widely spreading tree, a black? oak, with narrowly oblong to lanceolate and mostly entire mature leaves, but young shoots with leaves inclined to be spinulose tipped and toothed. Below and to the Cota fence is an Anona bush, 10-15 ft. high, rigidly and openly branched and with tufts of leaves on the ends. Sphacele does not go below 5000 ft. The liveoaks are 5 to 1 as to Pinus cembroides. The spotted leaved Desmodium is common on rocky slopes down to 4000 ft. Thalictrum peninsulare is 4-5 ft. high, erect and only at Laguna along the creek.

Sept. 27. Went out to the beach, 2-3 miles and loafed along on the rocks listening to the beautiful and high waves as they broke on the shore. Also got quite a load of stuff, but did not see any Œnothera littoralis, nor Drymaria, so common in 1928. There is a cæspitose Cereus like Engelmanni, but smaller, with red flowers and red and shiny fruit, several hundred joints in a loose clump 3-6 ft. wide, common by the sea on rocks. The petaiya is somewhat creeping here. C. Thurberi also is low. Guavas, mangos, and avocados are ripening now. We saw the ciruela plum ripening on our way down the Lagunas.

Sept 28. Left for La Paz on a truck so early (4 a. m.) that it was cold, and got there at 9 a.m. Feels good to be at the old Palacio hotel. The folks remembered me and glad to see me. I called on Carlos Leon, my friend. special federal agent, who was glad to see me. Will do odds and ends today. It is getting hot. Weather clear. Barometer 100 ft., normal elevation. No mail yet Will have to stay a week for steamer for Loreto. Can get fruit here, such as avocados. mangos, oranges, lemons, and cocanuts. Vegetation is greener here due to higher humidity. There

are 18 pearl fishing boats idle in the harbor now due they say to the beds being fished out. Saw an antelope chipmunk in several places north of the Cape and also the pure blue bluejay.

Sept. 29. Did not botanize yesterday but spent the day trying to hire a boat to go to Espiritu island. Will walk out to the brush to photo the viejo cactus, Cereus Schottii. Boatman is to come for the island trip tomorrow. No storm on tap for bar. is normal. Humidity at 9 a.m. 95%. Walked out ½ mile to beyond the tannery to photo cactus. Feet gave out not because of heat. The viejo cactus is a case of fasciation or cancer, and often occurs with the flowers, where the internodes are shortened and spines elongated to 2-4 inches, which gives it a whiskered look, and so the name of old man. The fruit is small, smooth, red and edible and the seeds black and smooth. Other species, as Pringlei are often viejo. The petaiya is larger here, often with stems a foot thick, but branches 2-4 inches thick. Flowers like the night-blooming-cereus. Cereus Thurberi has flowers about as in giganteus (apparently) and a globular fruit about an inch long and spiny, as in gummosus and red when ripe. The abortive Opuntia is taller here, often 8 ft high and corymbosely branched above, fruit proliferous, light-colored and nearly free from spines. Cereus Pringlei here is very large and thick. Saw the little Grahamii Mamillaria today. The petaiya flowers and fruit are common here now. The fruit of C. Schottii is red, ½-1 inch long, smooth. I learned today that they call the last east and west ridge of the Lagunas the "Victoria" mts., whose highest point is San Lazaro. 4 p.m. have secured a boat for 8 a. m. to go to Espiritu island, and hope for good botanizing tomorrow. Humidity 80%.

Sept. 30. Off at 8 a. m. in a 20 ft. boat. Sea smooth, fleecy clouds. Once in a while a big 3-cornered flat fish like a flounder would dart out of the water and turn half over and come down flat with a startling bang on the sea. It seemed to be having great fun at it. The boatman called it a manta, apparently the tinterero dreaded by the old pearl divers. Recently Capt. Anderson harpooned one 13 ft. across. Reached the island in 3 ½ hours by the old Ford-driven motor. On shore saw a black jackrabbit near the waterhole. More vegetation there. More cardon, petaiya more abortive Opuntia, also the yellow-spined cylindropuntia. No C. Thurberi. Saw a little Cucurb.. may be the wild muskmelon Found the usual prostrate Euphorbias and a new one a shrub with habit of Eriogonum Thomasii with innumerable drooping stems inextricably interlaced, near shore on storm line. Simmondsia Prosopis and Cercidium are common here as on the mainland. All vegetation dried up. Got Cevallia at the waterhole. The southern end of the island is eruptive. volcanic ash, and isolated flows mixed and tilted 10° plus to the west. The north end seems to be sedimentary, sloping northwestward. Many shells on beach.

Very sandy beach. Gentle breeze from n. e. Got the Eucnide shrub at the waterhole. Was back at La Paz at 6 p. m., and took in Pechilinga island on the way, getting Fouquieria Burragei there A lovely but disappointing trip.

Oct. 1. It is sweltering hot and threatens rain, cumulus clouds in sky. Humidity at 11 oc. 78%. Bar. normal. They say it is raining at the Cape, very cloudy with little wind. Weather at 6 p. m. excessively hot and raining at the south of us. The soaring birds all down, but some swallows flitting about, the cloud barely moving. Bar. going down.

Oct 2. It looked very much like rain last night and still does. Pigs here are the red kind. Took a trip 20 miles south to the Cacachilla mts., but did not get beyond the foothills at 2500 ft. alt. and still in the Tropical life zone. Got a wild guava and some other shrubs. Was disappointed in not getting farther but driver feared the road for the sand was bad. All is granite blocks rounded and not angular on the hills, with a little schist here and there, no water, looks very much like a storm with strong wind from the east, very heavy and black clouds from the south and s. w. but no rain yet. No mail boat in, due to threatening storm, 5 p. m. a fine and misty rain is falling: cooled off a great deal; everywhere are black clouds and sea somewhat rough, but not bad yet.

Oct. 3. Went east 5 miles along beach to get Coulterella and saw many bushes all dried up and dead, only one alive. Very hot and dry. Got all tired out and thirsty. Barometer still out, but it looks as if storm is over. Steamer still in port. Got a pretty Prosopis (?) about 3 ft. high, much branched and spread out wide and full of fruit. Got Spirostachys in full flower, common on flat at slaughterhouse, with some bushes on tideland flat, but did not see the new Agave of 1928.

Oct. 5. Arranged to go to Triunfo 53 miles south, on the Cape route, with Capt. Anderson of Long Beach who is going there by private conveyance to try to evade a $120 fine for trying to smuggle in gasoline as fuel oil, hoping, if caught, to bride the officials. He is drinking heavily, but I can take care of myself even if I never drink. He is to return for me next day.

Oct. 6. Reached Triunfo duly, alt 1500 ft. Veg very dry and same as at La Paz. water in places along creek near town. Road washed considerably by last rain. Quite hot here, but not so bad as at La Paz. Hotel has cement walls and roof thatched with Washingtonia leaves set 6 inches apart each way, with petioles stripped of teeth and cut a foot long and tied to horizontal canes laid on rafters 3 ft. apart made of 2 by 4 scantlings. It makes a pretty roof. Leaves at least 3-deep and set petiole up. On the hills, in granite crevices is Notholæna Lemmoni, no other

ferns. The hills are mostly of granite rounded masses, with some obscure quartzites, and some white quartz veins. The old French silver smelter, probably a relic of Maximilian days and which made La Paz a big city is now shut down and dismantled since my last visit, but a bank of reverberatories and 8 sets of 5 stamps each of the mill and a huge tailings dump are left and a roaster, all now rusting up in the weather. Triunfo, a city of many thousands once, is now a typical scene of desolation. The substantially well-built adobe and cement homes are abandoned and roofs falling in. The thriving stores are closed and only an excuse for one left, run by a Chinaman. They have a girls' school of 25 pupils here, dont see where they all come from. The cemetery also has gone to decay, Louise Nesbett's tomb, a Mormon's ? is best preserved. Never saw a worse case of desolation, except Rayolite Nevada. Parkinsonia aculeata is cult. here, also dates and Washingtonia, but not Erythea. Some C. Thurberi, one bush of an elongated C. Emoryi, one flat Opuntia and some abortiva, much shrubbery of Tecome stans, Cracca, Prosopis, etc. Jatropha with smooth leaves, the horrid J. urens, Antigonum Leptopus, a little annual Verbena, Aplopappus diffusus 8 ft. tall.

Oct. 7. Went up the steep gulch below town. The C. Pringlei here is mostly whiskered (viejo) at tip. Vegetation more vigorous. but whole country sheeped out as if over-grazed, the nearer one is to water the less is the herbiage. The petaiya and Thurberi are less common; the little Mamillaria is common on the hillsides and so are Prosopis and Antigonum. Foggy in a.m., was cold last night. I met Coda here from Todos Santos and had a fine visit with him. He says the people are very hard up and starving and the stock dying from the drought.

Oct. 8. Waited all day for Anderson to show up and then went to bed. Was waked up at 1 a. m. by Anderson forcing his way into my room and insisting that I join them in going to La Paz, saying that they lost their way and went to Todos Santos and came across country for me, so to avoid explanations about this mythical road I joined them. They had a bottle of tequila along which I refused because I never drink, but Anderson was woozy by the time we got here. Will dry out today and put in press Weather cooler and clear, but bar. reads 180 ft. which is 100 ft. off. Humidity 70%

Oct. 9. Barometer normal. Clear and going to be hot. Mangos ripe and dates and bananas also, grapes passed, sweet potatoes on the market at 6 cts. a pound. Corn is very high. Very little hay for sale. Stock starving on the dry pastures, the recent rain will start vegetation. Business is flat. No pearl fishing, Went to Pichilinga island in a. m and took photo of Fouquieria Burragei. Seems to be a good species; flowers yellow and buds red, lobes very short and round, about equaling tube, spreading abrupt-

TRIUNFO, L. C.

CEREUS GUMMOSUS

ly. Stamens much exserted: pods short and appressed. Should grow on mainland. Did not see Atriplex macropoda anywhere. This is the type locality.

Oct. 10. It is clouding up as though it was going to rain, but bar. normal, humidity 75%.

Oct 11. The little coast boat, Sonora, came in at 10 a. m. Last night was delightfully cool.

Oct. 13. The boat stayed in harbor two days, fearing a storm but is going out tonight. Got all my stuff on board in evening Sea is calm, making a dreamy afternoon. The Sanvitierra, the copper company's boat from Santa Rosalia came in this p. m., the Bolivar, a federal boat and one other is due tomorrow. Corn is 2 dollars a bushel and hay 4.50 a bale. Cocoanuts and dates are ripening fast,and mangos a little passed the peak. The avocado, shiny kind is on the markets.

Oct. 14. My boat did not go out last night. The Bolivar came in at 8. They say the tide here is 7 ft. At Pichilinga is. there seemed to be no tide for the water almost touched the shrubbery, may have been high tide. This is a beautiful morning. A fine boulevard, just completed, a mile long, skirts the shore. The white and block-like Mexican houses nestle under the rounded ceiba trees and lofty cocoanuts and Washingtonia palms. The leather factory har one small steamer in the bay, idle from lack of work; money too tight. All as quiet as a Sunday at home Oct. 15. We pulled out in the night and.early before day stopped in a cove and landed some freight: then took a small boat in tow for an hour and then cast off and put in to a little ranch among date palms. Formation here is all sedimentary except a little island of eruptive. Seems to be Triassic; may be Tertiary. but too many older strata above it, certainly not Carboniferous. There are great red escarpments, or greenish or white, with here and there sandy beaches. but coast line mostly precipitous, ground color some shade of red. These hills look rather bare but must be fine botanizing in January. Formation very regular and horizontal, cliffs at the back are 2000 ft. plus high. All Tropical. There are pretty little recesses with sandy beaches. No evident signs of water but vegetation greener in the draws. We are now very much nearer shore, a mile off or so, very beautiful as we pass by. The formation dips slowly under to the north, probably all Triassic. No big and hard boulders. Just passed an alcove with dates in it but no sign of habitation but a rowboat high on shore. We now round a point and see a launch anchored out. Country now rather chocolate-colored and looks like a series of horizontal lava flows. Came across 2 pearler boats here. Cardons are scattered along shore, with petaivas and C. Thurberi. Some pelicans fishing. Off the coast in the morning were 3 islands, still visible far away. We now have taken 4 pearlers in tow, one of them is the M. Louisa, the boat I hired to go to Espiritu Santo island.

One of the boats, the Kreuger, has quite a load of unopened oyster shells, Certainly this region is a series of lava flows, but all seemingly stratified, the lowest one rather thick toward the n. e. Wind freshening and our tow shipping water. Our skipper signaled them to set sails. which they did and now riding better. 1.30 p. m. Wind has died down and we are near shore. We are now approaching an island ½ mile long, and east of it is another 15 miles long. Carmen is., which has a high range along the middle . There is a high ridge 4000-6000 ft near shore on the mainland and very steep at the shore, beginning about opposite Carmen and seems to end in a high peak which must be near Loreto (Sierra Giganta). Our tow riding finely now, sails barely drawing now Carmen is. seems stratified, the shore being barely 1 000 ft. high. The slopes of the Sierra Giganta must hava many mountain sheep

Loreto. We had to land in the surf in canoes and got through dry. Got a good room in a quiet place. It now is a little town, going to decay, once the capitol of the peninsula and religious center in the days of the padres, and with a fine old cathedral which is now a crumbling ruin with roof falling in. The town lies on a flat at the mouth of a dry riverbed, and extends to the seashore, a few hundred yards of alkaline soil, growing dates which thrive best under such conditions. It seems to have plenty of water but not running and has to be pumped 10 ft by windmills, as is done at La Paz. It is a forest of dates, Sonora palms and ceiba trees, with enormous mesquits 40 ft. high and over 2 ft. thick. No figs nor sugarcane. It is calm and still at sunset. Children stare at me just as they do at the north. Quite a number of husky women and girls here.

Oct. 16. It is bright, clear and still. Old cathedral a picture of desolation in the midst of a beautiful orchard, all caused by the hostility of the cowboy revolution. Went out along the beach to the hills east and got some stuff, very dry, rather hot, was back at 2 p. m, ate some petaiyas, Got a Celastraceæ shrub, with green flowers, the fruit suggests Maytenus, having red covered seeds, straight stems 6-8 ft. high, gray and smooth bark. Farther on got auother similar shrub, but taller and more branched with dark bark and green flowers, and fruit Amelanchier-like and drooping, a Spring leftover, 5 stamens, a disk. no petals, white sepals ridged within and acute. The abortive Opuntia is here but taller, also the cylindropuntia like C. Emoryi. C. Pringlei is common, very bald, glaucous and big. C. Thurberi is occasional and more racemosly branched. Saw and photoed one petaiya 20 ft. long and decumbent (see cut). The viejo cactus is common, also Fouquieria in full leaf and branched racemosely, but is not Burragei, flowers few and fruit clusters small. The lead colored flowered Lycium has red and small berry. Many shells on the beach.

LANDING IN SURF, LORETO

LORETO, LOWER CALIFORNIA

The pearlers collect various shells for pearls as shown by the tons of univalves on the shore. The pearl shell most sought is not an oyster but a symmetrical kind of clam about 5 inches wide The beech is low and not steep, as it is at the Cape, probably the Gulf between here and Carmen island is shallow and relatively close by. Dates grow best here in alkaline soil. The Sonora palm is ripe and 50 ft. high. none self-shedding. Got a smooth Jatropha with leaves purple-tipped and flowers drooping as in Vaccinium and cymose, bark gray. Bursera here has smooth white bark not shredding up and in fruit has copal swellings. The viejo cactus has 5 ribs normally, often almost spineless below. Humidity at 3 p.m. 70%. Have seen no Tecoma so far. Just arranged a trip up the mountain for 5 pesos a day for 4 mules and young Garizar as moso starting In 2 days. Prices cheap here. Went down to the western beach and got many shells. There is an Erythæa growing here which seems new and which I shall call E. Loretensis. It is glaucous, as is armata, petioles spineless, seeds oblately round and lozenge-shaped, black, $\frac{3}{4}$ inch wide, tree with persistent leaves: flowers in panicles like those of Brandegei on peduncles half as long as petioles, outline lanceolate and barely surpassing the leaves; bracts very small and green, not sheathing, acuminate, inconspicuous; segments of leaves taper, as in Washingtonia and ending in threads: erect, 25-30 ft. high.

Oct. 17. Clear and still at 8 a.m. Boys helping me dry driers, crazy to do things. Humidity 67%, bar. normal. breeze now from n.w. There are 2 ceiba trees here with spread of branches of 20 ft- each and fig-like trunk 3 ft. thick, leaves elliptical-lanceolate. Night. Went east horseback to the hills and got pretty sore from riding but got quite a bundle of specimens. One Eriogonum is new, of the perenne group, with capillary stems, glaucous, and branching 2 ft. in all directions, in sandy soil. Got Stegnosperma shrub a foot high, with white flowers and glaucous leaves. Very dry. The Fouquieria appears peculiar, has some flowers and fruit. The cardon is glaucous-gray with white spines often almost abortive, probably the cause of the name "calvus" bald, a good vsrietal name. Stems very big. Got a coarse annual 3 ft. high, with habit of Stillingia, Sebastiania sarmentosa. There is a shrubby Suæda here, 4-6 ft. high. Spirostachys is often 4 ft. high and woody almost throughout, very common on sandy flats. Went to base of hills, but strata coarse there, Pleistocene. Got some fossils like the living shells in the sea, strata in black mud. Humidity at noon on hills 18 percent.

Oct. 19. Humidity 68 percent, bar. normal. Primiera Agua 9 miles west of Loreto in the foothills of the Sierra Giganta 400 ft. alt. Humidity here 28 percent. Vegetation the same as below barring alkali stuff. Washingtonia common, Tecoma stans

coming in, no Yuccas nor Erythæas, Cereus Thurberi and gummosus also absent; water rather much in the volcanic ash seeps but is good and has a Polygonum in it like the Cabo one, and another aquatic. Eustoma is here, also Cyperus, Eleocharis and Cenchrus, no grasses to speak of but devil grass. Olneya is common from Loreto up. Dates, sweet lemons, limes, oranges mangos, guavas and pomegranates are grown here. There are 2 Populus Fremonti. Hills very dry. Saw one specimen of the tufted Cabo Cereus with flowers red and 1.5 inch wide, also Manillaria Poselgeri is frequent. They have a big and warty sweet lemon with thick skin and another with big navel that are sweet. Their oranges are beset by a chocolate scale which yellows them considerably too early, trees 40-50 ft. high and full of fruit. Figs and grapes are out of season. Much Washingtonia cult. here.

There are several ponds with Typha and Scirpus in them and one Cyperus and Seymeria. In the orchard are 2 Euphorbias: also saw the new Sebastiania and got specimens. Petaiyas are ripe and in flower, C. Thurberi has 14 ribs and the cardon not over 10, the viejo mostly 5. The soil is volcanic in horizontal flows. Evening. Went through the garden twice and got a great load of stuff but nothing startling, but all good. Capparis here is a tree 30 ft. high, with gray and snooth bark, trunk fully 1 ft. thick and erect and appletree-like, flowers as if in racemes. and fruit an oval seed, berry, or drupe, Baccharis sergiloides just in flower. very graceful as in Adenostoma sparsiflorum, about 8 ft. high, in bottoms and moist places. Eucnide is on sandy bottoms and 3-4 ft.high. Saw Jatropha urens. The evening is delightful, with no wind. The day was hot. The water flow is about 2 miners' inches and comes from the north bank, enough for the garden and very fine water too. A watermelon Cucurb. citron? has smooth and green fruit striped, stems 20 ft plus long. There is much palo blanco.

Oct. 20 Humidity 88 %, bar. high. Clear and still, will be hot. Left my bundles here while I went horseback up the creek to the upper ranches. The Iuca ranch is 800 ft. alt. Very dry here, with water in the gulch. Coming back I got an Agave on the rocks, also Mamillaria Poselgeri. Humidity 70 percent. My moso cuts Parkinsonia microphylla for his mules and also the cirhuela, Turnera. No grass here, sheeped ont. Magnificent scenery all along for 5 miles. Strata level and overlying eruptive, with here and there an eruptive dyke cropping out. At Primiera Agua there is a split in the strata. At about 4000 ft. alt there are no oaks visible. The palo blanco is everywhere. Cereus Pringlei is scarce and Thurberi is more common and so is the petaiya and viejo cactus near the middle ranch. Got a magnificent Plumiera growing wild on trail above. It has the habit of a willow, with smooth red flowers and pods 3-5 inches long with cottony seeds and is 2-valved, the flowering stalk is 10-15 inches long and at last florif-

erous on the upper ⅓ with alternate clusters, but panicle not over 2-3 ft. in all. (The peduncles 10-15 ft. not inches as given). The Eucnide here does not grow on rocks. Got a Compositæ shrub with narrow panicle stalked but not over 2-3 ft. in all. There is a Hymenoclea, 10-15 ft. high, with rough bark and trunk 4 inches thick, with airy panicles at the ends. Saw a Passiflora with white flowers 3 inches long, several times. Weather hot and dry. Distance to first ranch a short 3 miles and 2 more to the upper. About the same water in each. A very fine grotto on the first ranch, used as a bathing place.

Oct. 21. 8 a. m. Humidity 100 percent, bar. 211 ft. Clear and still aud no sign of storm but humidity too high. Slept well last night. My skin on arms burned yesterday as if poisoned, and feels tender today. Moso says mules will not eat palo blanco but very fond of palo verde and the Turnera. The high peak south of here seems to be like the first one an abrupt escarpment on the eastern side and rather sharp on the west also, at least near the top, and seems to have palo blanco all the way up, there is little evidence of oaks anywnere. The Pleistocene sediments go about to the middle ranch and then stop.

Oct. 22. Got to Garizar mill 3 miles below the Cayuca, at 6.15 Alt. 675 ft., humidity 30 %. Getting cloudy at the west. Mesquit large, palo verde very common. Vegetation greener than at Loreto.

Cayuca ranch, 2.30 p. m., 1000 ft. alt. Humidity 58 percent. Got many things in the box canon here, some ferns. Clouding up with some fleecy clouds. We are about a mile from the precipitous face of the mt.

Oct. 23., 8 a.m., bar. 600 ft., humidity 92 percent Fleecy clouds, looked a little like rain last night but did not rain. It is still this a. m. The old Garizar mill above here is a quaint old ruin, built by a trusting Mexican, on the word of a man who said a rusty iron seam was a gold vein, built at a fine waterhole where water was plentiful, seeping out of rocks, the solid stone house and fine well and ample yard with great shading mesquit with 81 ft spread and 40 ft. high made an ideal situation, but all for nothing. Got back to Loreto at 11.30 of the 21st and stayed all night and the 22nd. started for the peak and at 1 p.m. unsaddled in the brush for noon where there was plenty of palo verde for the mules. Got to the mill for the night, 3 miles from Cayuca ranch., here was Bursera, Sapium, Olneya and some Antigonum, cardon, C. Thurberi, petaiya. The cardon shows the calyus form well. Saw one fruit, the first seen. The 23rd got to Cayuca ranch at 2.30, 1000 ft. alt., humidity 58 percent. Mules ate even the twigs of Turnera. Last evening we went 2 miles up the big barranca coming back by the water canon and getting a great load of stuff, mostly shrubs. The Franseria is 8 ft. high, with woody

canes and bright-yellow flowers. Got a yellow Lantana. 6 ft. high but branched lika the rest. Ruellie peninsularis Rose is very common, but the blue flowers scarce as usual. Saw one cardon with 27 branches a foot thick. There is one hybrid here with Thurberi here, never saw any more.

1 p.m. Got back from trip to cliffs and reached 1499 ft. alt. Vegetation the same but greener. Got quite a mass of stuff, but nothing very marked. Followed up the main canon where we left off yesterday. From specimens of Fouquieria seen at Loreto I noticed variations toward Idria making that genus a vegetative form of Fouquieria. This therefor becomes F. columnaris var. peninsularis (Rose), which is specifically distinct from splendens The form here branches like other shrub genera but the trunk tendency is toward intumescence as in Idria at base. The little Mamillaria occurs everywhere and with scarlet fruit linear-clavate. The yellow-spined Opuntia is a little more slender than abortiva and with spiny or smooth fruit and does not proliferate. Evening. Saw the same Agave as at Primiera, in full fruit, may be a Hechtia, 3 ft. high, with linear and rather open leaves. There seem to be 2 species of Agave here besides the long and narrow-leaved one with close-set black spines which are inclined to be flexuous, flowering stalks over 10 ft. high.

Oct. 25, 8 a. m. bar. 1000 ft. alt. humidity 90 percent. Clouded up some after dark, still and warm last night. Ready to start. Vegetation here mostly petaiya, Pringlei and Thurberi and some flat Opuntias, 2 Jatrophas, Fouquieria, 2 Acacias, palo blanco and verde , 2 Prosopis sp? and a few other shrubs, annual Setaria Panicum, Tribulus small sp., Amarantus, Trianthema 2 sp., Agave on cliffs by water, no Yuccas anywhere, nor native palms. The cardon here very big.

Got to Arroyo Undo ranch and water at 11.30. Fine water is fenced in in a gulch a mile to the south. The water in a hole in the bedrock at the house dried up along the creek. Went up half a mile and got an oak and turned back because of the dryness, and saw our mules hiking down the trail for home and so told the moso who set out after them. Here we are at the upper limit of the cardon but the other cactus are here. Celtis coming in; brush taller; much Sapium 10-15 ft. high, the many stems greenish-brown: many Ficus Palmeri. The soil is still dark and volcanic, with niggerheads all over, menacing the feet, trachyte, little sign of basalt, looks as if it had been erupted in water. Decided not to go farther toward (25 miles off) Comondu because of the dryness. Trail poor. Coming up from camp we ascended 1000 ft. in a mile, over a monstrous ledge. Shrubbery the same here as below but Fouquieria less common and broad-leaved and Jatropha almost gone. Saw some walnut trees among the oaks but no fruit. 2200 ft. alt. humidity 78 % at 3 p. m. Fleecy

SYCAMORE CREEK, TEXAS

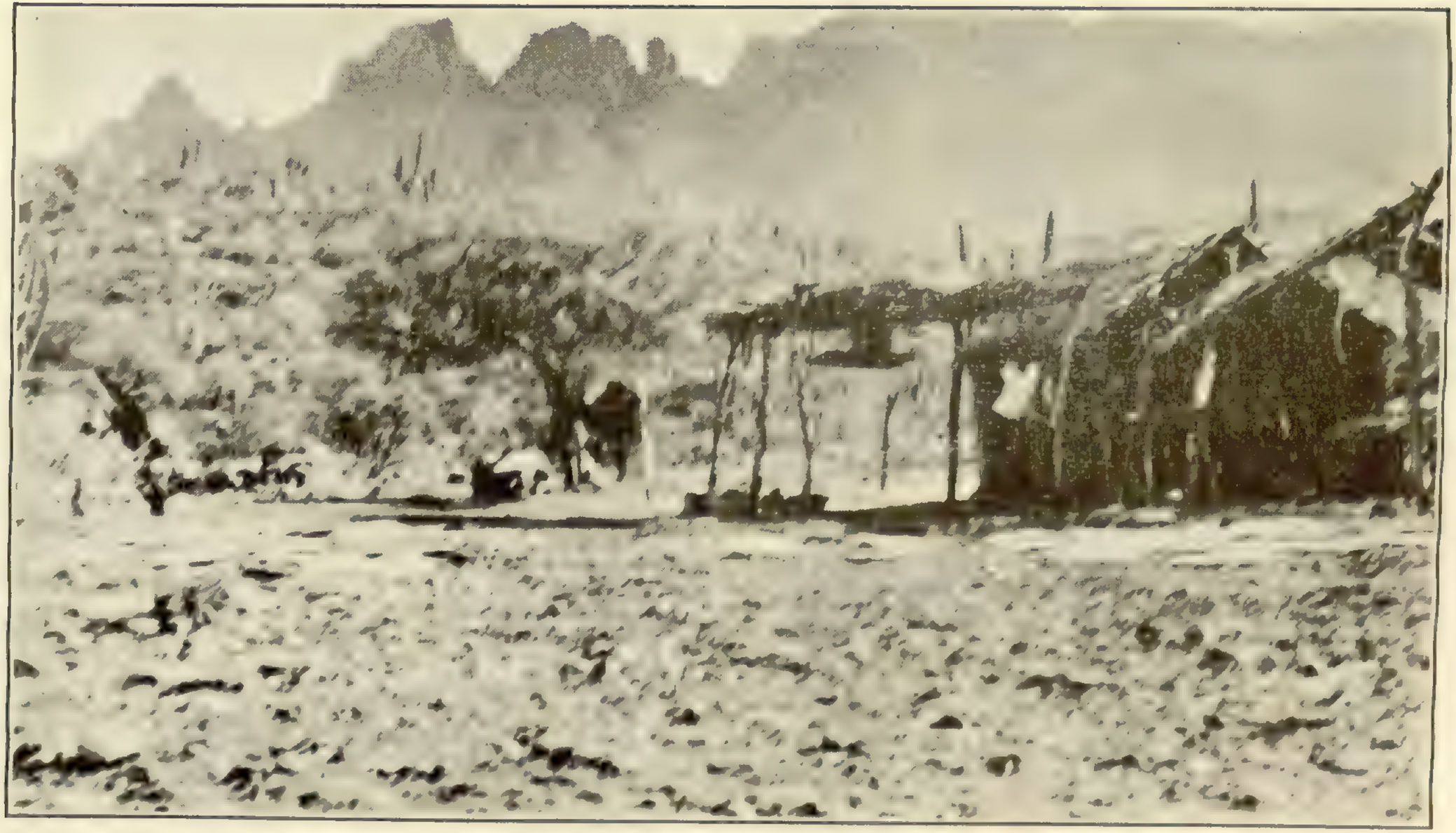
ERYTHEA ARMATA

clouds. There is an Acacia here with white flowers and hooked spines that is very annoying and at all elevations, rarely 10 ft. high, but have seen little fruit of it. The persimmon is a shrub about 15 ft. high, but have seen little fruit of it, also got it at Primiera Agua and could not tell what it was till I got the fruit. There is a wasp here with nest hanging down horizontally like an inverted plate, 4 inches wide, others tongue-like hang from twig ends and cliffs. The wasp is narrow and yellow and rests on the water like a skipper and does not wet its feet, and flies from it easily, have seen hundreds of the nests. There are other wasps that make nests on tree trunks like a dirt covering, and 1-3 ft. above ground. The Sapium has almost every fruit bored and eaten through. The berry is 1-3-seeded in each fruit, mostly 2, hemispherical, striped and dotted when not eaten Erythrina Mexicana is frequent, with trunk 20 ft. high and 1.5 ft. diameter, smooth and gray and rather tuberculated on some branches like goitre: fruit pendent, long-beaked, with seeds scarlet and with a pulp-like filling between. Saddled up and went down to the Cayuca ranch which is just a shelter beside a big corral and is thatched with palm leaves. It has a stone wall 4 ft. high. and is the merest excuse for a home. Will not rain tonight. We are on our way back and I am not satisfied with what I got because of the dryness, but it will be drier on the western side. There are many more flat Opuntias here with yellow spines and big joints Asclepias subulata occurs also. In a gulch got a beautiful mint 6 ft. high, with many slender stems gray and erect among loose rocks at the bottom. Also found a small tree 10 ft. high, Prunus ilicifolia without fruit. There is a beautiful amphitheater here a mile wide with precipitous face near the top, 500 ft or more high and with many liveoaks along the upper slopes and in draws below cliffs. Strata horizontal but all eruptive in layers 2000 ft. thick. Saw 3 people today, on their way to Comondu. Palmer figs very tall. Saw a puddingstone boulder 30 ft. high overhanging a gulch. Am getting over being sore from riding.

Oct. 26 Arroyo Undo, 7.30 a. m. Just began to rain gently, sky all overcast by a thin cloud, sun coming up in the east; they say it may rain all day. The owner of the ranch came down from the waterhole above which he reached yesterday noon and stayed all night with us, another man came just after it began to rain and so there are 4 of us now under the meager shelter. Got all our stuff out of the rain. Mules are tied to the brush on the water trail. Bar. 2100 ft. and indicates little rain, humidity saturation. Seems good to have some rain at last., cool night. Yesterday had impaction of the colon and had to dig out to save myself, a painful job, due to Mexican cheese which I ate, and from no other cause and so I took a laxative to restore normalcy.

After a time the men took my tarpaulin and tent and put them on the roof to keep out the rain, and now we can be dry. the tarpaulin leaks a little at first, probably will swell tight soon. 8 a. m. Steadily raining; everything outside is wet. Shelter leaks some but tent does not, soon a boy came on horseback, and now we are 5. Rain keeps falling, but looks thin to the east, waterproof cover to hat comes in handy this a. m. There is some wind from the west. 8 30, has stopped raining but looks dark all around still. Probably ¼ inch rain fell in all. Wind still strong from west. Bar.2000ft. 8.45 Heavy clouds from the west falling below the top of the mt and moving fast to the n. e.. Sprinkles once in a while. Does not look good yet, Brighter to the n. w., but clouds still low on mt. and raining. Wind still a breeze, but barely sprinkling. The palm thatch on shelter seems to have too narrow petioles for Washingtonia, and many with no prickles at all and few th reads, probably are Erythea Lorensis. My paraffined tent is not wholly waterproof. I should think 10-oz. duck would be about as impervious as my tarpaulin which was guaranteed to be waterproof, but not so at all. Weather cold. The owner says the palm leaves came from the south side of the mt..for there are no palms here. Whether he means at Parras or Primiera Agua I dont know, but none of Erythea since we left Loreto. Clouds still at the west but low though brighter to n. w., but no sky visible yet. Just out of Loreto we passed a clump of Larrea in full bloom. This shelter has a fine 3-foot wall of stone and a stone corral. Bar 2050 ft. They say this is an exceptional year for dryness, usually much rain in Aug. to Nov. The waterholes are all so dry in many places that the ranchers had to move out, but stock could get water in isolated places. Cattle look in good condition, mules also. 11 a.m. went down to canon n. e. and got quite a load of stuff. The red Mentzelia was on the rocks, and saw Eucnide there, got a bush Brickellia-like shrub stragglingly branched, 3-4 ft. high, saw Stegnosperma. Got Evolvulus, a low Franseria like ambrosioides but perennial (Ambrosia?), The big bush one is common, acerifola n. sp. Got a bush Anoda. It rains by spells a little and looks very dark to the east, but storm comes from the west. The boy seems to have gone. The young man who came first started to go but turned back. It is sprinkling now and the men are loafing, clouds far down on the mt. and below us on the east. Mists a little now and then. Liable to be here all day. Could as well go to Cayuca ranch but moso not inclined to start. Horns of mt sheep are here as well as white tailed deer. They say they are frequent on the mt. Argemone hispida I see here, 3 p m, storm is over and clearing and very blue sky. Feel fagged but have done nothing today but loaf all day. Moso is taking mules down the road and brought them back and saddled up and we went to the Cayuca ranch as noted above.

GARIZAR RANCH



CAYUCA RANCH

The last half of last sentence on page 108 should be omitted for we stayed all night and went to Cayuca ranch the next morning as noted below.

4.30 p.m. Went across gulch to see what I could find and Got a Selaginella spreading and rooting over the ground in large patches, 1-3 ft. wide. Also a Cheilanthes (Pringlei?) under rocks and barely in fruit. Got a few others also. Clouds still hang low on mt but no rain, getting dark.

Oct. 27, 8 a. m. Rained a little last night. very cloudy but clearing now. Bar. at 2000 ft. Humidity saturation. Will be clear and hot today. Everything is wet, mules look a little gaunt, vegetation seems perfect, cool and delicious. Will get off by 8 a. m. Hope to get to lower Garizar ranch today, 4 miles below Cayuca ranch early so that I can dry out. Clouds going s. w. In the center of the amphitheater at Arroyo Undo is a big draw with with many dark-green trees, probably Celtis pallida which go to the bottom of the big cliffs. If it were a little more humid it would be fine for ferns. The so-called "palo fierro" is an Acacia for I saw the flowers, not papilionaceous but with few flowers. Palo blanco is common, both Jatrophas are here, one with smooth and glassy surface and dark-green leaves, but never common, the small and shrubby plant with spike of small and greenish flowers on rocks seems different from the taller one on bottoms, in leaves. Will get off at 8.40. Got to Cayuca ranch at 10.40. changed drivers there and put in fresh plants by 12.45. Got dinner of coffee and cake and fish or cheese and are about at the end of comida. may get to Loreto tonight if we drive late, should get off by 2 p.m Bar. 1050. Feel somewhat tired. Coming down I found the hill is 800 ft. high to the level below, and from there here is 200 more Rained here as much as with us. Cereus Thurberi branches near the ground, and Pringlei 2-6 ft. above and branches seldom with nodes, Thurberi almost never. Some men passed us on their way to Loreto with dates as freight and came back today empty. The "palo fierro", ironwood of my moso has straight spines an inch long and has much gray fruit 3 inches long and is common here.

4 p. m. reached Salto ranch below mill. They have a well here 30 ft. to water now. Usually there is much water in the creek where the bedrock crops near by, but is dry now. Fouquieria it not in leaf here, Cercidium and Prosopis are here, much C, Pringlei, some Thurberi and Capparis which they call "palo San Juan", Ruellia, Iresine seslerioides are here also. The volcanic flows are tilted 15-29° to the east. Saw a Larrea 10 ft. high a few miles back in a gulch, also got it here; fruit $\frac{1}{4}$ inch long, elliptical, deeply 5-grooved and splitting into 5 carpels which are nearly closed and are white-spreading-hairy, otherwise as usual and flowers with yellow petals rotate-spreading and turned edge-

wise like propeller blades; stamens 15, somewhat recurved one in a while, united below into a disk: ovary smooth; seeds lunate, acuminate at both ends and much so above and hyaline and vacant for ⅓ their length, with a ridge of material along the back and less evident on the belly, with base vacant but shorter and seed showing through, much flattened laterally and sharp on both edges, as long as pods, 1 in each cell. The generic character has 10 stamens. Stegnosperma. growing here has flowers white, and petals cordate-ovate, on a short stalk, reflexed, a little longer than the pistil which splits into 5 broadly linear and truncate branches, stigmatose ¼ the way down on the inner face, but finally reflexed and separated. The woman here fed us on rice, fresh cheese and coffee:is good to get a little to eat after ours ran out.

Oct. 28. Bar. 400 ft. alt. humidity 90 percent Quite cold last Clear and still this a. m. They have 10 calves here. The cheese was fine last night. In a Cereus Pringlei tree here, 1.5 ft. diam. a dead one all rotted out, the central half foot was hollow where the flesh had been, then came the woody bundles where the ribs had been, wood very soft and pithy and of many layers which split into many long strips forming poles used for rafters for houses. There is total absence of any means of heating except by open fire and nothing a t all to warm any room, and no need for any here. Right here at the ranch the ochotilla is partly in leaf, showing previous lack of rain and the scarcity of water and need of wells and absence of fruit on the cardon shows the same. The petaiya has a few flowers and some fruit and all its stems tend to lie on the ground and root on the under side, forming new plants for I have seen stems 20 ft. long, with new shoots along and forming new plants but still connected with the parent. Thurberi branches close to the ground mostly. The mules eat Trianthema greedily. Got home at 4.30, and pretty tired from the 20-mile ride. It rained here some from the n. e. and windy this p.m.,and sea rough. Got Larrea soon after leaving ranch and it was common to 10 miles out and seems like ours but taller. Cercidium pallidum and Parkinsonia microphylla look much alike, but in leaf are very different, the latter is the best mule feed, except Turnera, but mules eat Trianthema and auy Malvaceæ. The top of the hill north of Loreto on the way to San Bruno is 700 ft. alt. and will have to be graded before autos can pass. The Sierra Giganta as understood by the natives is the the high peak n. w. of Loreto, but in fact should apply to the whole range. The alt. is about 6000 ft. with liveoaks nearly to the top. The range is formed of horizontal eruptives worked over in water and cut off on the east by faulting at the crest along the axis, mostly free of shells except below 1000 ft. alt. where Pleistocene sediments begin on the mesas There are many fine fossil beds particularly at the SanBruno summit on the wagon road. Trails are good

except for small niggerheads all over the upper reaches where they hurt the feet. There is some alkali on flats and much Spirostachys and shrubby Suædas. The ground produces the best dates on the coast if drained.

Nov. 1, no word about steamer yet, but it is due today from the north. Yesterday a Chinaman struck me to buy some pearls but I was not in the market for them but offered him half his own price to get rid of him, which he refused. Went out a mile or so to the n. w. and got a few species, an annual Euphorbia that may be new, very common there by tank. Aplopappus diffusus is in bloom there. This a. m. the Chinaman called and put the gems in my hands saying they are yours at your price and so I was in for it and pungled up the 20 pesos, for 7 pesrls.

Nov. 2, a Copper Co's boat came in today to load wood, and expected to hang around for some days. No word of the Sonora yet. Clear and still., 0 ft.high, humidity 91 percent., actual alt. is about 25 ft.

Nov. 3. The Sonora is in going south. The Corriente goes north tomorrow, and I will take it to Santa Rosalia. A fine young man from Todos Santos called on me. Weather lovely and hot, wet heat. No rain. Went east and got Suæda, shrub 3-6 ft. high and straggles up among the bushes but often flat on the ground. There seem to be 2 sp. of Lycium here, both 4-10 ft. high, much Spirostachys. Steamer departs in p. m., almost packed up, looks like a general storm is brewing; may have rained a little last night. Got a berth and am all set now and ready to go north. The men aboard can talk English some so that I can visit a little

Nov. 4. Got to Santa Rosalia at 4 a m. Warm and still. many people here. Hills with little vegetation and very low brush Three palms in plaza but no sign of blooming ever, but may be the Sonora palm W. Sonoræ. There is a palmetto cult. there, Went out 10 miles to the Mulejе road by auto and found veg. more starved. Larrea is about 3 ft. high, on uplands and 6 ft. high on flats and is very common . Also Encelia farinosa, Jatropha cancescens is rarely over 5 ft. high and with the big bases of trunks very scraggly, and so is the purple fruited Bursera. Fouquieria peninsularis is also common and low. Aplopappus diffusus is on some flats in bloom, Stegnosperma is 4-6 ft high, low forms of Prosopis occur, Cereus gummosus and Schottii are common but very low, Pringlei is on flats only, the yellow-spined Opuntia is the only one and scarce. No grass. Nothing but scanty shrubbery The big bracted Celastraceous climber I also saw, 3 ft, high here There were algæ in an aestuary south of the road which is very winding and r eky near the sea. Rosario is 65 miles north and Muleje 41 south. I disembarked here intending to stay but the flora in bloom was too meager for me and so at 5 p m I took the same boat for Guaymas and am aboard. many passengers going. Fleecy clouds.

Nov. 5, Boat left Santa Rosalia at 8.30 p. m. and got to Guaymas at 6 a. m. Got off boat and to hotel by 8 a. m. Got mail at last. Very dry and warm here, no rain in a long time, clear and still. Am answering mail today. Hired a launch to go to mouth of harbor and got a few things but too dry. In p. m. took auto to Miramar and Empalme around the hills to study palms to the north and west but found none wild, very dry everywhere, Parkinsonia aculeata on slopes and much mesquit, dense Cereus Pringlei on islands but scarce elsewhere, C. gummosus scarce, Schottii frequent and small, Bursera, Jatropha and other L. Cal. shrubs the same species but less common though Larrea and Prosopis are more common, Encelia farinosa is everywhere, Aplopappus diffusus is frequent, and so is Wislizenia in cult fields.
Nov. 7. took baggage to depot for Mazatlan but agent refused to check 9 of my bundles and said they must go by Express. As it was I had 100 lbs extra baggage for which he soaked me plenty, but after an hour I am now all ready to start. Clouding up a little but not warm. The hotel porter is fine help, 50 years old and gray It has been beautifully cloudy all day.
Brandegee surely was wrong when he said Erythea Brandegei was common on the coast. The only fan-palm is Washingtonia. I suspect the stray ones I saw on the Lagunas in 1928 were Brandegei, and I saw but one little one at San Bartolo where he said it was common. There are none at Santa Rosalia nor Guaymas. At 7 p. m. it rained enough to make the streets muddy, heavy clouds and much sheet lightning coming up from the s. w. and no wind. Went to station at 1 p. m. and it began to drip and got worse all the time. Train pulled out for Empalme at 12 where I had to change to Pullman. Moso proved to be a grafter and stuck me 6 pesos too much.

Nov. 8, Rained all night. Pools of water on the ground. Vegetation has been very dry going out. Bar. 75 ft. alt. Much Prosopis, Franseria acuminata, Cereus Pringlei and Thurberi. a straggling Opuntia leptocaulis, also a cylindropuntia and a flat one, the pink flowered Echinocactus Wislizeni and a beautiful Cæsalpinia in flower. No grass. Things just coming into leaf, a tree, Acacia? near kil. 718, Bombax, Capparis, no Fouquieria, some Larrea, now an occasional Fouquieria in full leaf as we go along, our heavy train is slow, Stramonium, Teucrium, shrubby Heliotropium in flower; vegetation 10 ft. high: ground bare, an occasional persimmon: low mts. on the east; Bombax in flower at kilometer 725, and at 729 we cross a river 150 yds wide, and a R R. going down river. 9.20 a. m. sugar cane and dates. San Blas Sonora, not the city on the coast; an old, old town. Country now looks pretty wet and soggy, much cylindropuntia now, Prosopis very common, Lysiloma, not candida. 10.15 a. m. It is raining again and somewhat chilly, still soggy, keeping near the

CANOTIA HOLACANTHA

LA BARRANCA

FOUQUIERIA BURRAGII

coast all the time, but cannot see the water. Much fan-leaved Lysiloma 30 ft. high, persimmon; cactus scarce. Kil. 829, mostly Legumosæ shrubs coming into leaf. The Manzanillo Mimosa now. Hot, heavy rain here, Franseria ambrosioides, some undershrubs coming in, pumpkin vines along small river. Kil. 837, Culiacan, Guamochil, a small town. Had much rain here, just saw a grove of Sonora palms: very cloudy and still, mostly leguminous bushes and few cactus such as Cereus Thurberi. Everything wet. There is a low, 4 ft. high, Jatropha common, like canescens. The settlements all have palm-leaf roofs, low mts. far to the east. Crops all harvested and they are plowing for new crop Vegetation 10 ft. high, and much the same as at the north Big-leaved Cassia?. More stock at Culiacan, everything wet and muddy, clouds going slowly, vegetation very green; people all appear happy; many scrub goats and sheep with tails not bobbed. 2.30 p. m., ours is a train of 12 cars, all passenger and Express. 4.20 p. m., raining again, much Crotalaria and Antigonum, country soggy, much Lysiloma, some Cereus Thurberi and Pringlei, a few big leguminous trees 40-50 ft. high, country normally wet, beans, bananas, sugar cane, some weeds. La Cruz a pretty town by a river 50 yds wide, charcoal in pits, bananas, Plumbago scandens in bloom. We are now by the ocean, still wet, little cactus Dimas, quite a town on the eastern side of track. and with river 200 yds. wide showing traces of a great and recent flood with muddy water. Mazatlan, cool here Got here at 7.30 and went to hotel Del Mar by the sea. Mud everywhere, very cloudy outside.

Nov. 10, 9.30 a. m. Slept well, weather muggy and raining at sea and sprinkling here, road bad with mud and it looks squally to the n. w.

Nov. 11, soggy, wet and rainy and very cloudy. All my baggage came yesterday. Got everything ready for the trip to Guadalajara and stored 8 bundles and valise here.

Nov. 12, 3000 ft. alt., grass knee-high, Epicampes grandis, Andropogon and Aristida, big Tuna and Cereus Pringlei, now we are passing a cult field of Agave: Helianthus or Tithonia, Stevia; flowers everywhere, some big leguminous shrubs, Bocconia. Tetitlan, on the east is a volcano that has erupted since the railway was built and the lava flow reached the track, white ash above and black lava below, rained hard yesterday, 3300 ft. alt. a charcoal station, it looks like the Ixtlan region, near La Barranca, now see many large shrubs with white and funnel-shaped flowers, Bombax or Apocynaceæ, much grass everywhere, Dalea little feathery flowers and tall plants 2-3 ft, high, much red or orange Dysodia 3700 ft. alt., Bambos vulgaris. water very dirty now, we are near

the liveoaks now, grass shorter, clouds lying low, kil. 1613, barrancas appearing now, 4150 ft. alt., everything wet, much charcoal visible now, have waited here an hour at La Barranca, they say a slide has blocked tunnel no. 19 and that we must transfer to get through 10 miles from here. Time has not changed this town any for the roofs are still covered by old tin from 5-gallon gas cans. There are a few scattered liveoaks. Got here at 12.50 and stayed till 3 p. m. when we went to the tunnel and walked to the other side in the rain, carrying our baggage with us and waited an hour for the relief train from the south when we climbed aboard and are now waiting to go at 4-30. Wont get to Guadalajara till late but I got a few sp. by the track while waiting. We have a big load of passengers and are about 4000 ft. alt. See no liveoaks. Still drizzling at 5 p. m., 4400 ft. alt. Good view. There are several ridges or ranges in view now, slopes very steep and all bush 30-45 ft, high, big-leaved Senecio with yellow corymbs, also a white flowered sp. A small Dalea, very feathery, Eysenhardtia 4-6 ft. high, saw a Cucurb. with leaves like Megarrhiza a vine, several Euphorbias, much tall grass, stock in fine shape, people seem happy but huts squalid. Much sugarcane, been cut a long time and over-ripe and piled in heaps, oranges about ripe, see some mango trees but no fruit, plowing in places, water running everywhere, tall grass like Tripsacum 6-8 ft high, Eragrostis Purshii, 2 sp. Iresine, Buddleia, 3 white and purple mints.

Nov. 13. Got to Guadalajara at 10 p. m., in the rain and went to Phœnix hotel, 4500 ft. alt. Too much style here for me. Hired an auto to take me to La Barranca, not the town mentioned above, it is grand, on the plan of the Gand Canon but smaller, a box canon, 2000 or more ft. deep where the Lerdo river makes a hairpin curve at the junction with the Satiago, much vegetation. Called on the U. S. consul but he was out, rained all a. m. but clearing a little at 2 p.m. Called on the Cong. minister Mr. Kem and got him to recommend a good rooming place, Villa Florida and got my baggage all there at last. Tried to find the Cong. Institutio Colon school but the car driver took me far out in the country and back without getting there.

Nov. 14, still drizzling this a.m. and does not look as though it would ever clear up. There are 2 magnificent trees in the patio, 75 or more ft. high and 3-4 ft. diam., Ceibas?, with simple lance-acuminate leaves, not fig-like trunk but more like an oak or ash. Houses here are more spacious and with large central courtyards. There are epiphytes growing on the trees as in the jungle. Went down to the consulate to meet a Mexican botanist, Prof Puga and am to call on him Sunday. Had a visit with him but he cant talk much English while I can only murder Spanish with the resulting poor progress. Clouding up some or at least is not raining Will botanize this p. m. Distances are long but am getting oriented, my feet hurt some and get tired easily and feel fagged already. I do not eat much. Palmer and wife from

Pomona are here. Night, spent 3 hours botanizing to the east but did not get out of the city, but got a lot of stuff, There are bananas here and all sorts of fruit. they say it frosts some here Down town are places where they sell Cal. oranges, Woodbride and Wenatchee Wash. apples. These are the best fruit on the market. Very cloudy and a little drippy in p. m. with very low clouds. Did not get tired.

Nov. 16. Yesterday at 8.30 a. .m. the Parkers and I took an auto ride to La Barranca, and I stayed and they returned. I went down the tram a way and then took a trail and soon came out on a 6-foot way paved with cobblestones leading down to the bottom an old highway and still very much used for it was full of wayfarers. It is the most tortuous one I ever was on, skirting precipices 1 got only half a mile before I was loaded to the ground with specimens, a very rich flora of all kinds including grasses and shrubs, Anemia, 3 sp. Natholæna, 1 sp. Abiantum, 1 sp. Pellæa, 3 sp. Selaginella, Mentzelia?, Rhynchosia atropurpurea, several sp. Dalea and Salvia. I surely got loaded by 3 p. m. Rained on me twice, then started back lugging my load. At the top there were 3 eating booths where I got a bite to eat, and then left my load by the fence to go and phone for an auto at the house, but there was no phone there, but they said an auto would be at the booths for passengers at 25 cts each. I was too tired to walk the 5 miles home and so went back to the huts where they said an auto would be there in half an hour: so I stooped to tie my bundle better when a machine came in. The driver said in English "Get in" which I did and was whisked home. I offered him 50 cts extra to take me to the Villa which he accepted and landed me there at 4.30. I arranged with him to come for me Monday Sunday noon. I went to visit Prof Puga at his home at Sonata Guierra No 30 and visited an hour and saw his herbarium in little books and poorly named by Rose. He is a pharmacist in college. Got all but the Apocynaceous tree with long white flowers. Not all ferns are in condition to collect, one more trip will take me to the bottom. Weather fine all day. Some liveoaks appear on the benches but no pines. Nov. 20 Cold and clear this a. m., got a good rest, will loaf the rest of the day, spent forenoon in drying all my plants of yesterday in driers and will try to change some this p. m. but is clouding up. Am all ready for another day at the barranca. The river that comes from the n. e. is the Lermo but the Sentiago comes from lake Chapala.

Nov. 19 My auto man did not show up. I waited till ten and then phoned for another and got down half way and got another load of stuff, then back to the top where another auto took me home, Got some teosinte today, evidently a native of rocky slopes as corn grows wild here, Got a new sp of Clematis near the top

There are many self-pruning Washintonias here with varietal leaves of all forms, but no Erytheas, all cult.

Nov. 20, went to the barranca this a. m., without breakfast to catch car at plaza. Got down about a mile before I was loaded again It was hard work to lug back up at 2.30, but an auto was waiting so that I got home by 4 p. m. and feel tired. Found a peculiar Liabrum and all sorts of stuff, but did not get the Apocynaceous tree, for I had too much to carry as it was. Got a big Triumfetta and a Dalea and feel fagged. Weather fine all day. Got a big Desmodium and a peculiar Composite, Verbesina crocata, straggling upward over bushes as our Nemophila aurita does, but a shrub, with 3-winged stems, 6-8 ft. high and almost a vine and spreads all over and is coarse. Nearly clear now. Will spend rest of day changing driers. Slept well but had a hard time going to sleep.

Nov. 21, at 8 a. m. went to the barranca, getting there at 9 and got down to the meadows and botanized on the north. Got a load of stuff, 3-5 grasses and the Tripsacum and a tall Andropogon, cane-like, also the Apocynaceous tree. Will have at the least one more day there before I get to the bottom. There is a Composite, allied to Heclastocleis but not yet in flower. The meadows have more species than I expected to find. Got a tall Adiantum, and home by 3 p. m. Will not go out again today for I feel tired.

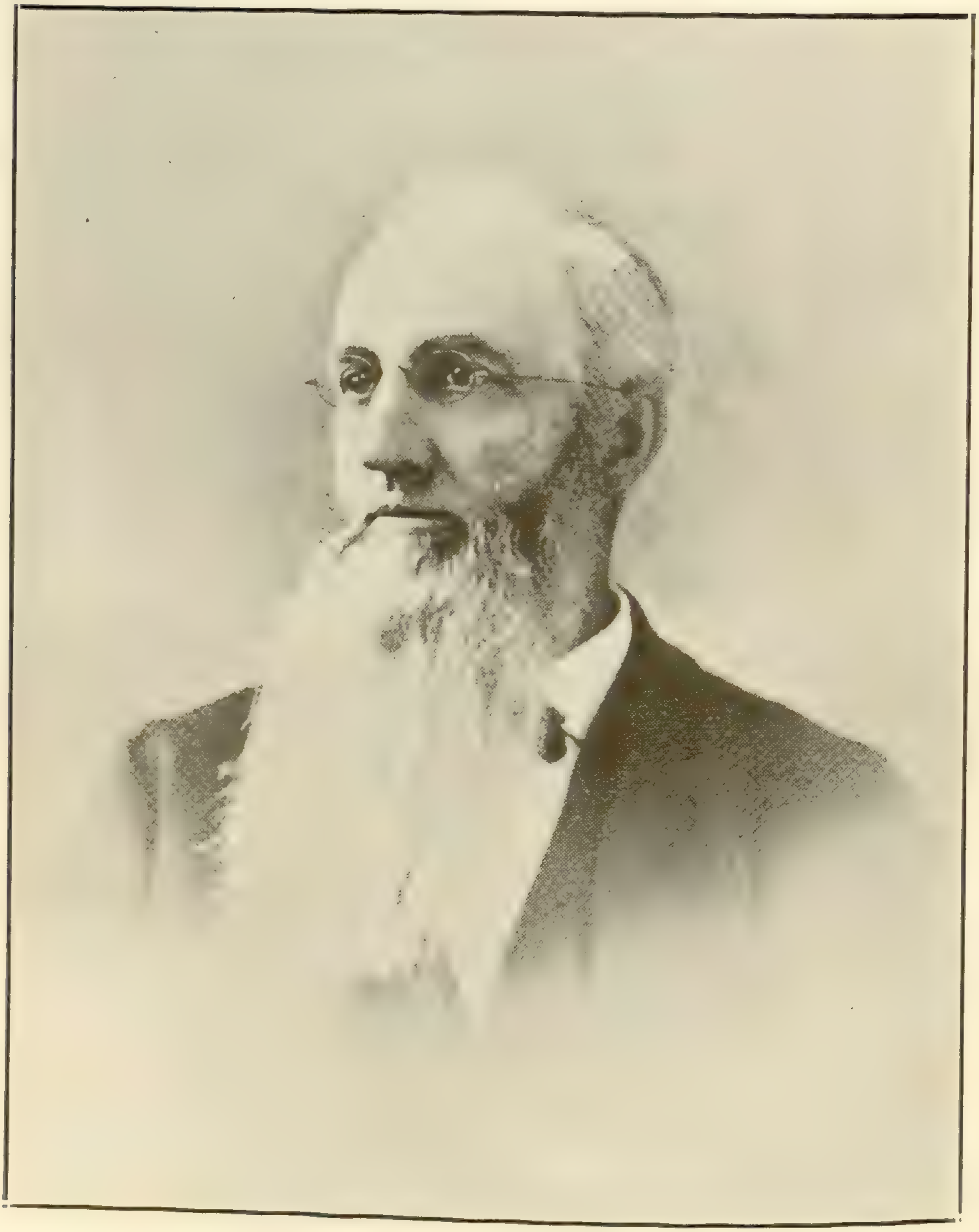
Nov. 22, am quite rested up. Went down to get a cover for my broken hygrometer, shops not opon yet. Took off a great lot of driers this a. m. In p. m. went east to city outskirts and got loaded down with 2 Cucurbs., one like a cross between a cucumber and watermelon, with a fruit 2 inches long and striped and smooth: the other a very spiny Echinocystis, crecping herbs.

Nov. 23, put plants in press Almost clear, and cold. Put a rubber sponge in helmit for use against heat. Went to La Barranca by 9 a m. and got down to and through the meadows on the south and got everything there, no ferns. One more day and I will be through. Weather fine but somewhat cloudy. Found an auto waiting for me at the top at 3.30 and now is waiting for more passengers. Less traffic today than usual. tFeel ired some.

Nov. 24, changed driers and went west to botanize but got little though I had a long walk till 5 p.m., got a fern new to me and a few others, and have cleaned up the region. Feel well still. It looked some like rain today and was quite cloudy in p. m. The ferns I got in a ditch 6 ft. deep and with vertical walls. Will go to the barranca tomorrow.

Nov. 25, put plants in press. It is nearly clear today, and cold.bar. normal. Got out to the barranca by 8·30 and went at once to the bottom at power plant and then south to where

JOHN TORLEY



SERENO WATSON

the trail comes nearest the river. and then back to the top by 1.30, and got a big and heavy load of stuff. It took me till 4.30 to get to the top and had to hurry some at that, was getting dark but I got home at 5. 0, and after dark, really 6.30 and feel some tired. No change in flora to speak of. Salix Bonplandiana was frequent on the levees and also a big leguminous tree in flower but could not get any. It must be over 3 miles to the top. Completed my work in the barranca and am well pleased at its thoroughness as to the seasonal flora. Had a fine visit with an engineer, a graduate from Cornell, who knew all the old time men there and who lost all his property in the Mex. revolution.

Nov. 26. they sell turnips here under the name of jicama Went down to Colonias today and got some stuff in p. m. on the edge of town by the R. R. went down town to get some old papers for specimen sheets and got on the wrong car and landed at the market and had to take a cab home.

Nov. 27. I plan going to Empalme de Orendain on train. Yesterday I got Argemone Mexicana in flower with lemon-yellow bloom, 2-3 ft. high and apparently biennial: petals evanescent. Got Baccharis 4-6 ft. high. Nicotiana glauca is common and cult. The shiny-fruited Mimosa is a weak annual. Went to Orendain and got a pile of stuff. When night came I went down to Santa Cruz 3 miles to get a bite to eat and a place to sleep but was refused, but waited around till dark, and then it began to rain so I picked up my bundle and took the trail back, it was pitch-dark so that I had to feel my way along the path, and soon came to a big buttressed fig tree where I sat down between the hummocks to rest. Soon the wet invaded my pants and chilled me, then I had to get up and walk by feeling my way along back and forth in the rain till I was tired and had to sit down, and so I worked till dawn. I feared a grip infection might result but there was nothing else I could do but make the best out of a bad situation and get over to the Orendain switch and water tank with the hope of finding a Mexican there with food to sell, for usually they are on hand to sell eatables. So at dawn I posted over there in the wet and found nobody there, and so I hid my bundle of stuff and began to botanize near by when a woman came in with milk and cakes which I bought and ate. I had to wait till afternoon for train back but spent the time botanizing. All prairie here with 2 sp. of oaks scattered on the hills. The big-leaved one, a tree 20 ft. high and is round-topped has corky bark in vertical ridges. the other is a white oak and rarely if at all a tree Got some new Compositæ, one 4 ft. high with purple flowers. Yesterday 3 freights went south but so far today but 1 going north. Bar. is 4800 ft. alt, No cactus but a few Tunas. humidity of the Guadalajara region is 60-90 percent. This is a great place for the

natives to gather with eatables at train time. The maximum elevation on the way here was 5000 ft.

Nov. 29. Will dry plants and pack up preparatory to going home tomorrow. Yesterday was my last day of botanizing. I bought for my daughter, Mildred, a beautiful Mexican serape for 30 pesos. To the south of the track at Orendain is a section house, and here and there over the prairie is a conspicuous Cacalia, 3-5 ft. high, with the same kind of leaves as the one at La Barranca, but with big white flowers and is a very interesting plant, leaves erect like the compass plant. The formation seems to be an impalpable volcanic ash that slakes in water making it opalescent like glacial water. Saw the first Pteris aquilina on the steep slopes of the creek here, and in the bottom an Eryngium with broad and undissected leaves, in wet places is a Downingia. The dry prairie has tufts of a cyperaceous plant and 2-3 sp. of Cyperus. The grasses are Epicampes, Aristida, Muhlenbergia and Sporobolus, and in the wet places are paspaloids the mesa vegetation is rater scanty, indicating less moisture and poor soil. The usual Hyptis is frequent, and also some labiates, Tuna scarce, saw at Guadalajara some fields of wheat. The country has scattered volcanoes and big plains and low mts. covered scantily with liveoaks and long-leaved pines.

Nov. 30, 8 a. m. All set to go, packed up and ready. Been here 17 days. Gave the girl a peso for being so efficient while on the job of caring for room. weather clear and still. Got off all o k. after some rushing. Got a seat in the first class car with a Mexican afraid of propaganda. Time to go but nothing doing. We change time here from local to Pacific. Acatlan, a small town at left of a volcano. Much Agave cult. here. Now out of liveoaks at 4500 ft. high, now at 4000 ft. alt., Magdalena is next and 4500 ft. alt. in a great flat plain surrounded by low mts., all prairie and grass 2 ft. high, a beautiful region. 4.40 p. m. we just hit a cow and cut her all to pieces.

Dec 1, Mazatlan, got here at 7 a m. in the dark and went to hotel Del Mar and rested all day. Slept some last night on train Weather is lovely, sea a little rough.

Dec. 3, left Mazatlan at 5a. m. all set for Nogales and home, will soon be off, as we go most of the country looks wet and soggy beans 4 inches high, and plowing the fields is going on, here is a very rank castor field for we are near the sea, now a little cardon. Culiacan, big cottonwoods along a river, Populus dimorpha? Guachil, quite a town, mts 4-5 miles east.

Dec. 4, we are now north and east of Guaymas, had a good night's sleep, getting colder. Querobabi, everything dead and dry and it looks frosty, clear and cold, grass everywhere but all dead, lumber houses and looks more American, a great plain, much cattle. Got to Nogales at noon and through the custom houses

in an hour. Weather fair and still, everything frosted, left for Tucson at 4.40, with all baggage checked for Pomona, feel much relieved, nothing now to do but ride home, have had a sour stomach for several days, and got a package of soda for it and feel somewhat better now. They are plowing, and some wheat is up. Plenty of water here. Got to Tucson at 6 p. m.

Dec. 5, now at Banning, cold and still, did not sleep much last night and my stomach much upset as if I have an infection. It surely is good to be this near home.

Dec. 6 got home duly, and was taken down at once with a very bad lumbago that made it very painful getting up and followed by ulcerated teeth and a temperature of 105°, so that I knew I had a serious infection which I began to control by medication. Then the teeth had to come out, and my doctor insisted on the hospital for me but I felt that although my blood pressure was 165 mm. I had the case under control. So next day my pressure was normal but the lumbago continued. Another doctor friend said I had rheumatism, so I began eating oranges and my trouble quit, but was Purgatory while it lasted.

After a few months of labeling I was at Berkeley consulting the Brandegee herbarium, for there was no one in California who was familiar with Mexican plants. Then I had another siege with lumbago and upset it with oranges. I doctored myself and family nearly always and never had any faith in the theory that bad teeth and rheumatism had any causative relation.

CACTACEÆ.

THE FANTASTIC CLAN.

A friend recently called my attention to a misstatement in this book (which I had not seen before) which has led me to go over it carefully and finding many errors that should not be permitted to go unchallenged. The authors assume an authority on pronunciation when the context shows no linguistic training.

The authors, Prof. Thornber and Mrs Bonker say on page 12 that "Near Victorville in southern California 'constellations' of huge masses of sahuaro (Cereus giganteus) are a sight never to be forgotten". Now what shall we say of this hyperbolic talk? The sahuaro does not form "huge masses" anywhere in California nor does it grow nearer than scattered along the banks of the Colorado and many miles from Victorville, the only noticeable things are

many miles from Victorville. The "Joshua",,Yucca, is the only plant growing in "huge masses" in California near there. Prof. Thornber knows better than to blunder like this and it is a good wager that he never saw the quotation in print before publication for it has the earmarks of feminine gush.

I am glad to note that they do not approve of the stupid Carnegiea of Britton and Rose, a name intended to flatter that old business pirate who paid the cost of publication and who did not think much of the proposed name.

I have often wondered how the sensible Rose came to do it.

The temptation to become a partner with a woman in a venture like this is great but a man gets the worst of it if he yields, for it is bad enough to have to face one's own blunders than those of others.

Their pronunciation is hopeless for it conforms neither to the English nor to the Continental method, both of which are found on pages 4-6 of Harkness's Latin grammar.

They give senilis as sen'-e-lis instead of se-ni"-lis, or sa-ne-lis by the Continetal; Johnsoni is given as John-son-e instead of John-son-i;they give aggregata as ah-gra-gah-tah instead of ag-gre ga-ta; Arizonica should not be Are-zo-ni-ca but Ar-i-zon-i-ca; They call Blakeana Blake ah na instead of Blake a na, their Cactaceæ should not be Kak ta ce e as it is in English but Kak tah-ka a, their Cereus is as it is in English but to be consistent they should call it ka ra oos. They mispronounce coccineus even in the English way for it is kok sin e us, but in the Continental is kok kin a oos; Covillei should be Ko vill i and not Ko vill e deserti should be de ser ti and not dez er te; Emoryi should not be Emor e but Em ory i; fulgida is given right in the English but the Continental which they ape would be fool ge dah; hystricina should not be his tre se nah but his tri si nah. They say in the text that macrospina means long-spined, but macros means thick; they do not give the proper name for the flat Opuntias which is Platyopuntia as given by Engelmann and not the illiterate Platopuntia of Britton and Rose. Wherever they use i in a Latin ending they make it ee after the Continental but are not consistent otherwise; they blunder on robustispina and say it is given as ro bus tis pena when it should be ro bus ti spi na; they give serpentinus as ser pen te noos when it should be ser pen ti nus; they call spinosior spin o si or when it should be spi no si or; they call viridescens vir i des ens instead of vir i des cens; they also blunder on Wislizeni, calling it Wis li zen e, when it should be Wis li ze ni. These errors are all from pp. 189-190. They do not give the habitat of all cacti mentioned, such as Cereus Johnsoni, from the Beaverdam mts. and Searchlight Nevada. The usefulness of the book is much impaired by the atrocious pronunciation.

In a savage review of this book "Desert" of the issue of Apr. 1932 page 130 makes a criticism that is unjust where it quotes the book's remark that some cactus will grow where the winter temperature is 25-30° below zero, calling it a gem of misinformation, but I have collected Cereus viridiflorus in Nebraska where the cold is 40° below and where Opuntia Missouriensis also grows. I have got Echinocactus Simpsoni, Opuntia fragilis, Mamillaria vivipara and Cereus phœniceus where the cold was nearly the same. My main fault found with the book is the unwarranted and unbalanced gush over this pestiferous family and the crude pronunciation. The illustrations are good and poorly colored. The printing and paper are fine.

CALIFORNIAN OPUNTIAE.

The name was proposed by Tournefort in his "Institutiones" for this exclusively American genus which was adopted by Linnaeus in 1753. Britton and Rose in their N.A. Cactaceae say that the name came from Opous where prickly plants grow. This guess is copied by the Oxford Dictionary, but there seems no foundation for it in fact. The name is from Opous a Greek town on the Euboean gulf, and ontioi the present participle of eimi, the verb to be, meaning being in, dwellers in, or as we would say Opuntians and it was notorious that those people were traitors to the Greeks in the Persian wars, and so the name became synonymous with traitor, which fact Tournefort knew. What more appropriate name could be found for this viciously horrid genus?

Engelmann split the genus in two sections, Cylindropuntias and Platyopuntia. Why the hopeless splitters, Britton and Rose did not make two genera from it fully as good as their Cereus segregates is unanswered, but as it is the species fall into two groups, the flat and the round. Where the surface is plane no special term for it is used as in the flat species, but in the others the spine areas or areoles are arranged on interrupted ridges in eight rows, which are called tubercles, as in the cylindropuntias, but though the stems are round in O. leptocaulis there are no raised areas.

Key to Opuntia.

Cylindropuntia.

Stems like pipestems, ½ inch thick, erect.

Tubercles absent, fruit red and smooth. 1 leptocaulis

Tubercles pavement-like, fruit very spinose. 2 ramosissima

Stems an inch or more thick. Spines mostly sheathed.

Tubercles 4-angled, nearly square.

sheaths filiform, ½ mm wide. 3 Bigelovii

Tubercles longer than wide.
Tubercles 2-3 times as long as wide.
Stems erect, sheaths 2 mm, wide.
Branches clustered at ends of stems, joints not readily falling, fruit very spinose above and bare below and dry. 4 echinocarpa.
Branches not clustered above, racemose, joints readily falling and swollen in middle, flowers red and proliferous. 5 prolifera
Stems prostrate or arcuate below.
Stems elongated and prostrate, flowers greenish-yellow. 6 serpentina
Stems not over 6 inches long, arcuate, with tip erect, spines flattened and sheathless, flowers yellow. 7 clavata
Tubercles linear and elongated, at least 4 times as long as wide, fruit dry, stems erect.
Flowers reddish, fruit not biennial, very spinose 8 acanthocarpa.
Flowers yellow, fruit biennial, spinose around the upper margin. 9 Parryi
Platyopuntia.
Fruit dry.
Fruit about spineless, seeds large. 10 basilaris
Fruit spinose.
Areoles about ½ inch apart, spines hair-like. 11 ursina.
Areoles 2-3 inches apart, usually spineless below. 12 rhodantha
Fruit edible and juicy.
Stems with trunk, erect, very yellow spined, fruit purple, with green juice. 13 chlorotica
Stems prostrate or spreading widely.
Stems widely spreading, the base rarely erect. 14 occidentalis
Stems prostrate or nearly so and forming wide areas
Joints large, mostly obovate, spines declineb and white above 15 Mohavensis.
Joints relatively small, many in a string. 16 Vaseyi.

O, leptocaulis Eng. is an insignficant bush along the Colorado river where the red and globular fruit, often looking like swellings in the trunk when proliferous are noticeable.

O. ramosissima Eng. is an openly branched shrub, like the last and growing in the brush also but has very spiny fruit on the ends of twigs, but the vestiges of tubercles set together like pavement blocks.

O. Bigelovii Eng., the horrid cholla, pronounced choia, is abundant at about 1009 ft alt. from Whitewater to Arizona. The erect stems are stout and 4-8 ft. high and with clusters of short and thick branches which fall off when brushed by stock and also adhere to the legs the more they try to kick them off. The fruit is yellow and mostly insect-stung, seldom maturing, and then with few seeds in an acid cavity, seeds white, borderless, 3-5 mm. wide, 1.5 mm. thick, round, sharply apiculate at raphe. This has the same disarticulating habit as O. cholla, prolifera, and fuigida have and are shunned by all animals but the cactus wren and mockingbird thrush which nest in its branches. Fruit very spiny when young and becoming smooth in age.

O. echinocarpa Eng. This is erect and 2-3 ft. high, with fruit spiny around the top, and maturing the season of blooming and much eaten by chipmunks so that seeds are hard to find. It abounds with Bigelovii and east to Utah.

O. prolifera Eng. This seacoast cholla is erect and widely spreading with scattered branches, and fruit often producing buds which become floweres and these again proliferating into a string of flowers each one ready to form a plant but having an encysted seed in the aborted fruit. This is a pestiferous plant.

O. serpentina Eng. This rare coast cactus from San Diego is the only really prostrate species of the group and has very spiny fruit and red or reddish flowers.

O. clavata Eng. This is the only cylindropuntia without sheaths and the only one growing in dense patches with short and hooked stems decumbent and rooting below, flowers yellow. fruit 2 inches long, with white wool and many spicules. Seeds about 8 mm. wide. Abundant at Searchlight, and in the Mojave desert and eastward.

O. acanthocarpa Eng. & Big The fruit of this is spiny to the smooth stalk and boadly oblong. The branches are a foot or more long and greenish-brown, with the reddish flowers at the ends. It also is strictly Tropical in habit, as is Bigelovii.

O. Parryi Eng. This species abounds on the humid western slope and has yellow flowers and fruit smooth except for a few spines at very tip. The fruits are much eaten by insects so that good seed is hard to find but is like that of Bigelovii.

The flatstemmed, Platyopuntia, species are common on the foothills from 1000 ft. to 4000 ft. alt., thouge not restricted to it

O. basilaris Eng. This is called the beaver-tailed cactus, and has the most beautiful purple flowers in the genus. It is Tropical and grows in the hot sands and is the only species with obovate-emarginate joints, 4-6 inches long, destitute of spines, bluish and with yellow areoles set in dimples on the surface, and rather close set, being about 7-8 mm. apart. The fruit is red, and dry and filled with the horizontally lying seeds, which are 8 mm. wide by 3.5 mm. thick, and with a thick corky and rounded rim 3 mm. thick.

O. basilaris var. Treleasei (Coulter). This variety is like the type in spreading decumbent over the ground, but has raised areoles and 1-3 short spines in them. Bakersfield.

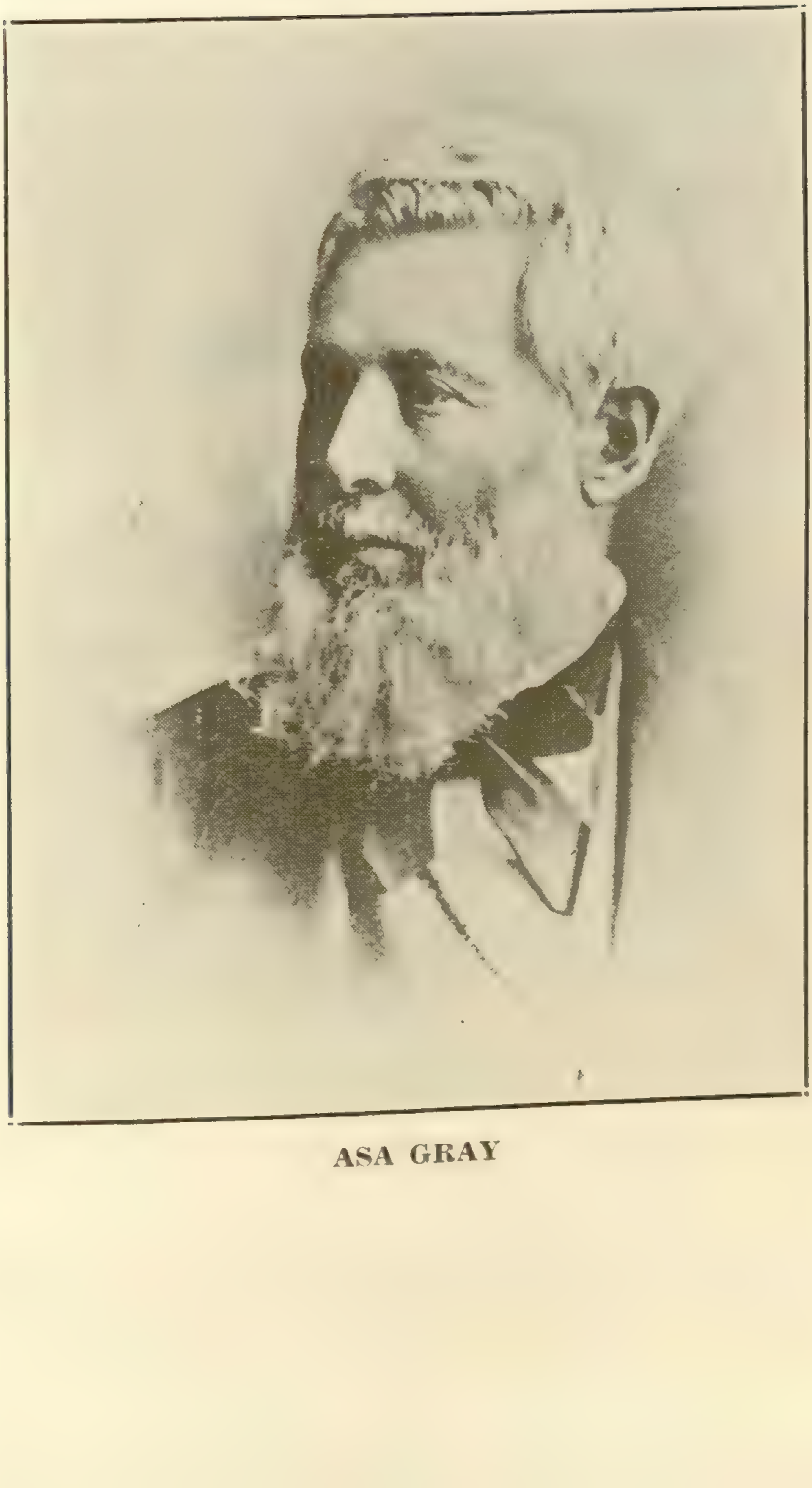
O. ursina Weber. This has areoles half an inch apart and usually with long and hairlike spines. When the spines are half an inch long it becomes O. eriuacea Eng. The fruit is very spiny.

O. rhodantha Schuman is the only dry-fruited one left. It grows high up in the Middle Temperate or Pinus ponderosa area of the White mts. The areoles are 2-3 inches apart and is red flowered. It forms clumps, being decumbent, and has small seeds. There is much doubt about the validity of this and rest of the species.

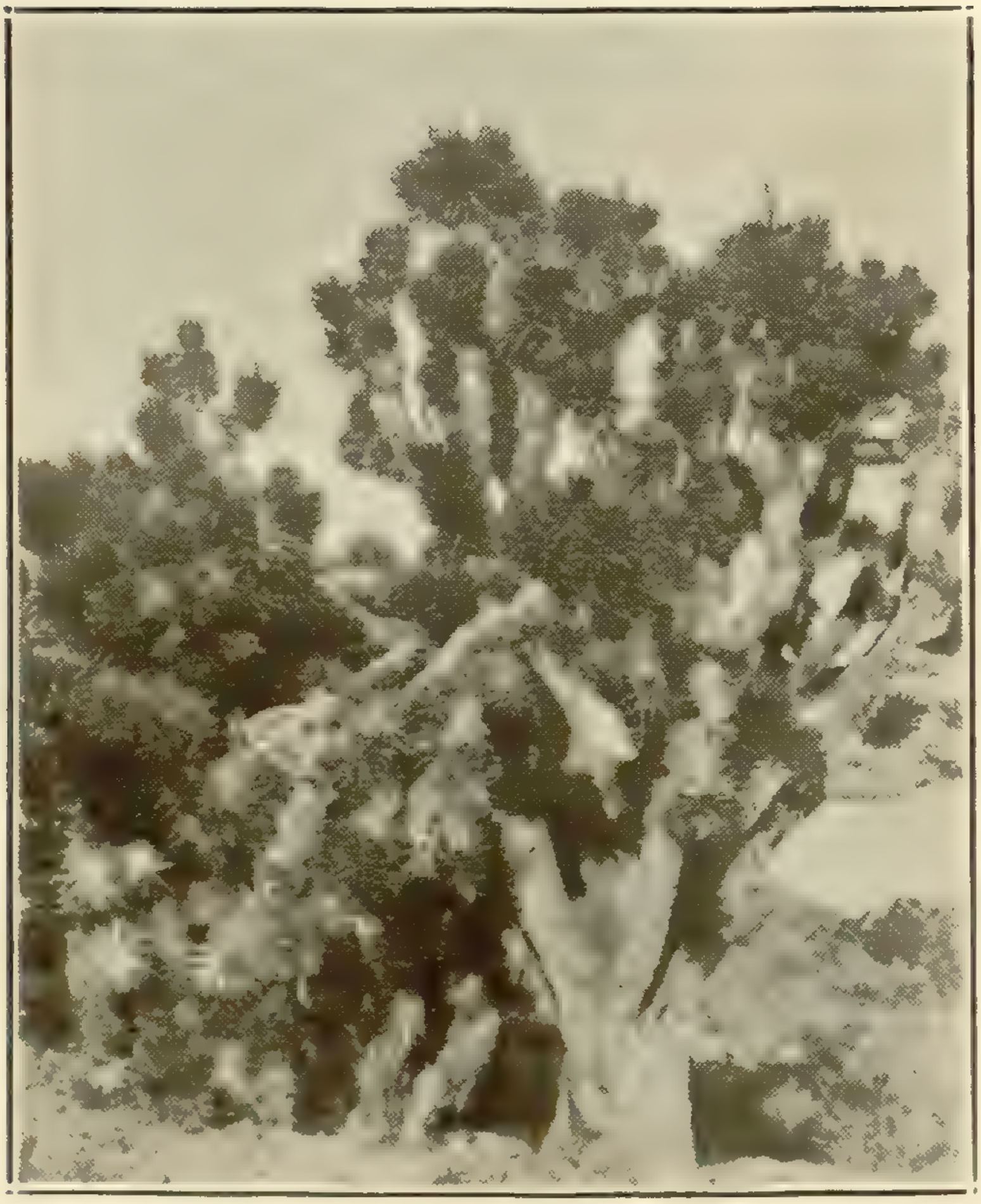
There are two cult species having erect and tree-like trunks, that grow with us, O. megacantha Salm Dyck which has truncate fruit and large and mostly spineless joints; and O, Ficus-Indica a narrow-stemmed cactus with deeply umbilicate fruit are cultivated largely as spineless cacti, having been exploited as such by Burbank.

O chlorotica Eng. & Big. is the only species left that is erect. The whole plant is kahki-colored, withthe very bristly bronze areoles and fruits with green juice. The joints are about round and half a foot long. This grows on rocky slopes near the Colorado.

O. occidentalis Eng. & Big. probably includes the following two species since there are no sure distinctions obtainable. The seed character has 3 sharp angles on the outer rim of the circular seed to which the juicy purple pulp clings, and the fruits vary from oval to oblanceolate, and from truncate to deeply umbilicate. The joints, or sections of stems, normally vary from round to elliptical or oblanceolate and run from half to a quarter inch thick, the spines are one to few and declined in the axils, variously angled, and red, black or brown below. The thin form of this species, O. Covillei Br. & R. also has yellow flowers and is common on the foothills, passing readily into the thick-stemmed var. littoralis (Eng) Parish, most common along the coast. The species has ascending to prostrate branches, often a foot long from very spiny stems which are erect. The seeds are flattened, 2 mm thick by 2.5 mm wide, with a rim .5 mm wide. O. Mohavensis Eng. is a nearly prostrate plant of the juniper belt, with large joints, and goes from San Felipe valley to 6000 ft. alt. in the higher mts. O. Vaseyi Br. & R, is another form of occidentalis with thin parts and small, reddish joints prostrate, and often purple flowers. It is common in the foothills.



ASA GRAY



YUCCA BREVIFOLIA VAR, WOLFEI

The color of flowers and juiciness of fruit are not reliable in describing species, nor is the shape of branches and number of spines and their color ,of value, but the distance of areoles apart is significant.

On March 3-4 in a trip to study cactus I found none to speak of till 30 miles east of Barstow where some O. echinocarpa and fasciculata came in over a small area and disappeared till 11 miles from Baker where they came in strong in a wash and prevailed to Mountain Pass and Yucca Grove where was very much Cylindropuntia wherever the yucca grew, elevation 3500-4000 ft. alt. The flat Opuntias came in at the pass, such as basilaris and much rhodantha with 6-10 reddening joints. Above Wheaton spring was some chlorotica, 3-4 ft. high, on rocky slopes, also Mamillaria deserti.

Yucca brevifolia var. Wolfei n. var.

At Yucca Grove and Mountain Pass on the Arrowhead highway are immense numbers of a yucca having small and oblong-ovate heads about 6 inches by a foot long, of flowers, which are sessile at the ends of the branches, the white flowers are 2 inches long, with the linear-lanceolate petals 2 mm. thick; stamens with globose anthers; odor carrion-like; leaves 4-6 inches long and very sharp-edged and short-pointed with a black spine. The stems are more slender than the type and have many more slender branches and with trunks rarely 3 ft. through. Named for Mr. Wolfe of the Santa Ana ranch who first noted it.

Hutchinsonia hyalina Jones proves to be a rayless form of Hymenothrix Wislizeni which Blake has mistakenly named H. Morrisii.

DICORIA T. & G.

This genus was first proposed by Torrey in Emory's Rep. as Dicoris on page 143 where it would be given later in the report, but never was, though it was fully given in the Mex. Bound. on page 87 as Dicoria where it was quoted as having been published. This deliberate error reappeared in the Synoptical Flora. It was said to have been discovered growing on the drifting sands (sand dunes) west of the Colorado "in Arizona" (California), "not since found" where it abounds today. The change of name was Gray's work, no doubt, for Torrey did not know Latin nor Greek, while Gray claimed to know both, but in fact was ignorant of Greek as shown by not knowing the genera of Cotyledon, Mecon and Erigeron. Gray was a great stickler for linguistic proprieties, but was always floundering himself, even in this case it would have been better to leave the original name unchanged or to have called it it dyschoris, false bug, which would have been better Greek, than to use a corrupt and an unclassical spelling for choris, bug. They state that the bracts are accrescent, a fact unknown to recent botanists, or ignored by them, and they draw them as plane, and give an erroneous impression of the facts. The stamens are not

drawn as they are in nature but the anthers are spread out as they become after anthesis, but in flower the tips cohere and the body of each bulges out, forming with the rest an oval mass till they discharge. The filament tube is a simple hyaline, 5-toothed corolla-like cylinder within the main obconic and stipitate corolla of the staminate flower. The fertile flowers are 3 and corolla absent, consisting of a naked ovary with the 2 linear stigmas, subtended by a floating and accrescent glutinous bract which is deciduous and carries the seed away with it. These 3 bracts are inconspicuous and small at first, the outer one appearing as a mere appressed scale, but beneath it is the first ovary which early becomes a seed and protrudes some till its bract developes and embraces it. At first the bracts are flat, oval and small, but in a few weeks become boat-shaped by the incurving edges and an inch long as in my specimens of Brandegei. The type of the genus was collected very late in the year, after frost, and this is why the floating bracts are so well developed. The type of Brandegei was got early in the fall before the last two bracts had emerged. The genus is annual, with the habit of Ambrosia and Franseria, and the rough pubescence, the outer bracts are explanate when mature, and oblong-linear and rather truncate at tip and 4-6 in number. Then come the 3 bracts with the fertile flowers, on the receptacle, and then the cluster of sterile flowers with the yellow anther ball. Ignorance of the late blooming was the cause of the remark of T. & G. " not since found", and of my failing to get it for 40 years, and of the blunders of Miss Eastwood, Kearney, and Blake in making synonyms. There are but 2 valid species, Brandegei and canescens, based on the leaves, narrow and broad. The mature plants are widely panicled like tumble weeds, but the floating bracts blow off before the roots loosen. The cotyledonal leaves of Brandegei are 4-6 inches long and acuminate.

About 20 years ago I was out on the Green River desert, Utah studying radium deposits, with my friend Robert Woodruff, now dead, and had just rescued him from dying of thirst when we came to a large patch of Dicoria, the first I ever saw, in October. The purple-spotted bracts reminded me of Astragalus pictus. so I sprang out of the wagon to look at it and began to shout "Eureka" and went wild saying "I have found the plant I have been hunting for 40 years". I knew it instantly and gathered it. No plants could be expected alive at that season. This explained my finding the cotyledonal leaves at Moab earlier, and led me to theorize about missing it before.

On Oct. 1st. 1933 I went to Mt. Pisgah an extinct volcano in the Mojave region near Ludlow, and found near Dodge station 10 miles east of Barstow large numbers of Dicoria in full bloom along the way, and none had a suspicion of an enlarged bract, and I got specimens of it. There were ripe single seeds in each flowerhead.

On Oct 23nd. I took another trip to the same place and found the plants in full fruit, and all of them full of ripe fruit and with the enlarged bracts concave and boat-shaped, and mostly half an inch long, and covered by stalked glands exuding a gummy and bitter substance. Most of the heads had 2 opposed bracts making a seeming laterally compressed and ovate bloom with each bract so concave as to loosely enfold an akene. The stiginas were 2, or split to the base and deciduous. Occasionally there is a long-stalked stigma below the group of sterile flowers as if another akene were about to develop, the staminte ones were always present. The akenes were quite concave and with incurved edges and with the center of the convex back full of stalked glands though the rest of the truncate akene was smooth and shining.

A few days after this I also went to Whitewater to study the genus there, but found none in bloom because the season there is a month later though the elevation is the same. Miss Eastwood was the first of the natural blunders to make fake species on the relative size of the bracts in D. Wetherilli and paniculata. forms of Brandegei; then Kennedy with D. Clarkæ from canescens; then Blake in Tidestrom's flora of Utah and Nevada copies them.

Oct. 28th. I went toward Whitewater, and below Cabazon on the way found all the plants in bloom and with no sign of an enlarged bract on any, and most of them with one mature seed to a head, which had no corolla. The unopened anthers made a yellow ball till they discharged, then they gave way at tip and flared because the edges are free. The type of Brandegei is young and immature and so has no enlarged bracts which Kennedy (not Kearney) gave to D. Clarkæ. It is now an established fact that the bracts develop very late consecutively.

Nov. 7th. I revisited Cabazon and found the plants with 2 3 floating bracts developed into hemispherical boat-shaped ones. about $\frac{1}{4}$ inch long, but when I went on down to Palm Springs at sea level Dicoria was only just in bloom.

Dec. 29th. I was again at the Springs and found the plants all in full fruif and normally 3-4 ft high and paniculate but some stunted ones only 4-6 inches high.

Jan. 3rd. Went to the Springs again and east to Kane spr. and found Dicoria here and there fully developed in fruit and 3-4 ft. high with the habit of tumble-weeds, but the bracts deciduous Had Gray known that there are 2 opposed bracts he might have called the genus Didymocoria, a better name.

Hutchinsonia hyalina Jones (See above) is a rayless form of Hymenothrix Wislizeni Gray which Blake has mistakenly named H. Morrissii, it is not often that one can correct two blunders at once but his species cannot be maintained in the face of integrades I am indirectly indebted to him for the correction.

Allium crispum Greene Pitt. 1 160. This good species of the erratic Greene is put by Jepson as a var. of peninsulare, but no intergrades appear over a wide field. Greene was so addicted to seeing characters that had no existence, that his descriptions did not pass muster with acute botanists, but in this case he was right

That the inner perianth of Allium is hyaline-margined is not known in native onions. In this case the segments have a thin edge 1 mm. wide which is so fluted as to seem beaded to the eye, but is white and crimped, but on drying seems lacerate. The bulbs propagate by division and are quite small and deep seated in the spongy gumbo soil which bakes hard in summer. A. dichlamydium, its ally is misspelled by Greene and by Jepson. Its segments are oval to oblong and acute, not acuminate, and without serration. Botanists will not soon forget Greene's eruption with new names for genera and species following the advent of the Kew Index, as though he had just come to that subject in his botanical studies. He was imitated by E. P. Sheldon on Astragalus where he made a new name for A. pictus Gray because antedated by a nomen nudum. Greene then switched to Dioscorides to exhibit his great Greek scholarship, using a recent translation of the old pharmacist's work. This bluff got by because Greek was not known to many or so poorly known, about as well as by Cope and O. D. Marsh, the zoological scourges.

ARCTOMECON CALIFORNICA.

In his Death Valley report Coville copies Watson's, Gray's, and Torrey's blunder on the gender of Arctomecon where they took it to be neuter because it ended in "on" the usual ending, but omego nu is not neuter for it is the ending of mecon.

There is in Utah and Nevada a large area of Jurassic or Tertiary clays representing ancient salt seas where alkaline clays are exposed which are so barren that litle vegetation will grow on them and here is where Arctomecon Californica abounds in Nevada No one has ever succeeded in growing it.

Psoralea hypogæa Nutt. is described as having linear leaflets, but they vary to oblanceolate.

Astragalus Brazoensis Buckley was one of my pleasant surprises in my Texan botanizing, for it grew abundantly from Eagle Pass to Uvalde by the roadside along with A. leptocarpus and Nuttallianus on the plains. The species I cannot describe better than was done in my monograph, and little can be added except that it is a smooth and prostrate annual in the open and straggling upward with other vegetation. The remarkable pods one never forgets, differentiated, reminding one of Medicago, Mimosa and Pithecollobium, and other aberrant legumes, in its strangeness. The ripe pods are mostly very flat so as to be linear in cross-section when mature, and arcuate longitudinally, with raised meshes on the angles, and the pod jointed to the calyx and opening along the ventral suture but not explanate. It is a good sheep forage but does not grow out of the Tropical lifezone.

Astragalus leptocarpus T. & G. is hard to distinguish from A. Nuttallianus in the field where they are found together. Normally it is erect from a decumbent base, a foot or so high, with the blue flowers capitate or in short spikes and twice as large as the other and the pods twice as long and wide, and smooth and not so sharply kinked near the middle. Plant normally quite smooth throught. A good sheep feed. Tropical though going a little up on the Edwards plateau.

Eriogonum trichopes Torrey. Gray was the one who altered this to trichopodum because it was a hybrid name. Had he been half as familiar with linguistics as he assumed he would have seen that the Romans were chronic violators of this rule themselves and did not lay much stress on it. Had Torrey called it trichopus there could have been little to citicize.

In a recent trip to Julian Cal., an old station on the historic trail of the padres, and the one followed by Bigelow in the Mexican Boundary survey when Artragalus oocarpus was first found and later on figured as crotalarioide by Torrey, I found this rare species growing by the old trail in the timber where Mrs. Brandegee rediscovered it some years ago. It grows in erect tufts there 3-4 ft high, but straggles over bushes in the shade.

Pyrola L. is messpelled Pirola by Jepson Man· p. 638 and by Torre and Harms Siphonegamia, but other authors give it as in the Species Plantarum. Bailey gives it right, but gives the derivation as a diminu tive of Pyrus. Pyrus is the Greek puros name for various kinds of grain because of the ripe color, red from pur, meaning red. It is more likely that the name was used because of the color of the flowers than any resemblance to pears. Bauhin first used the name which Linnæus adopted.

Crossosoma Bigelovii Watson. In his type description Watson says that the embryonic character disagrees with the Pæonieæ but in the field a person is struck by the similarity of the genera though Pæonia is an herb. I was glad to see that someone had courage to create the Crossomataceæ.

Argemone purpurea Rose is another of Rose's foolish species for anyone collecting along the Uvalde-Eagle Pass road passes past acres of hispida and then comes to purpled or tinged forms and then to all-colored ones and soon out of them again into the normal ones, some are almost black, then a few rods away are lighter-colored forms, one is led to think it a good species because the genus has none but yellow variants elsewhere. There is no other character but floral color to the species proposed by Rose and so it falls. This surprized me more to find it than I was to get white flowered Eschscholtzias at Cochise Ariz. growing wild, for I had seen white and pink ones in cultivation.

Defending Ones Self.

In writing on pages 3-5 Cont 17 I was writing of a historical fact as a matter of news, not knowing that it had become publicly distorted by Jepson to feed a grudge at being exposed as an ignoramus. It was not written as an apology and no attempt was made to soften down the event for I never felt any regret at my part in it, and I would do the same thing now. A man who will not fight for his rights is a fool. In my younger days I used to believe implicitly in the hairbrained doctrine of nonresistence to evil and other fool teachings of the Christian church such as divorce, but my experience in life has taught me that there are ones who will rob you because you are a pacificist, and others will skin you in the sacred name of love, and so the only way to secure the right is to fight for it. In Mexico they carry arms for protection. Once two men put up a job on me and tried to sneak up on me, but desisted when they saw I was ready for them. Pringle was a Quaker and lived his religion and suffered for it as a slacker in the great Rebellion, but I have long since discarded that hairbrained theory of Christ along with his other religious "revelations". We have crooked lawyers and judges who insist on obedience even to unjust laws, I do not when I know they were enacted by corporate tools for selfish reasons. When I was called for jury service in Salt Lake once I was asked if I would swear to bring in a verdict according to the law and the evidence. My reply was "No". When asked my reason for it I replied that I would swear to see that justice was done but I would not bind myself in advance to observe any fool law that might be in the statutes, and that the wrong side to a case usually presents perjured evidence. I was excused from service.

Streptanthus carinatus Wright and S. Arizonicus Watson cannot both be kept up and it is unlikely that platycarpus is separate. The degree of saccation at the base of flowers is variable. The petal blades are oblanceolate and conspicuously purple-veined, and with rather wide and hyaline margins as far as base of claws. The more robust specimens have the lower leaves conspicuously

lyrate-lobed, but smaller plants have all leaves entire. Entire-leaved ones fit Arizonicus well, from Stein s Ariz., my no. 28070 Forms that fit carinatus well are from Kent Texas my no. 28059 and Campbell's ranch, Azucar mts, Ariz., near San Simon, my no. 28071, but among them are forms that go as well as Arizonicus. The blades are very variable in width. If the species merge platycarpus takes the name. It is evident that some Streptanthi must go into Caulanthus.

FINANCE

People often write Pomona College for my Contributions as if it were my botanical legatee when it bought my herbarium, but it has no interest in my library or publications nor control over them, nor would it be tolerated if attempted. Since 1923 all material collected by me has been mounted or used as its own, but not under any agreement with me. The types of my 1926, 1928, 1930 and 1931 collections went to the College by agreement because it helped finance the trips, but since 1931 it has had no financial interest in my work. With these exceptions I have had no official connection. My publications are my own and written to state my opinions on modern day botany, in spite of unasked adviee of timid people, and at my own expense. I do not advertise nor sell to dealers, nor ask them to be reviewed because our magazines are in the control of propagandists who cannot be trusted to be fair or honestly review a publication which does not follow their code.

NORTHAMERICAN BOTANY.

Early in the 19th century and the last year of 1700 Humboldt with a great retinue of servants began exploring the flora of Mexico and in 1814 began publishing his "Nov. Gen. et Sp." in varied volumes, and laid the foundation for climatic and ecological research and developed knowledge of isotherms, laying down the limits of climatic areas in zones. This information was generally accepted by the world as correct. He divided the world climates into Tropical, Temperate and Arctic or Alpine, supposing them to be limited by the latitudes which he thought controlled continental isotherms. He published a diagram of the floral zones of Mexican volcanoes which was copied in Cornell's geography in my boyhood days and which I studied.

In the latter part of 1700 much botanical work was done by Muhlenberg, Marshall, Bartram, Elliott, Gronovius, Clayton, Bradbury, Lambert, Pallas, Plukenet, Catesby, Menzies, Nuttall and others either as collectors or authors till Michaux got out his flora of North America which in 1814 was followed by that of Pursh and Nuttall's Genera in 1818.

At this point on June 3, 1934, my father, Prof. Marcus E. Jones met with a fatal accident. He was returning alone from a day's field trip in the San Bernardino Mts. enjoyed in company with the Samuel B. Parish Botanical Society when, at an intersection in San Bernardino, his car was struck in the rear by another car and overturned. He was thrown out, suffering a basal fracture and other injuries, and instantly killed. He died as he had wished, "in the harness". In his home, or workshop, where he lived alone, were found his printing press, fonts of type, the completed pages of this "Contribution" and a binder of various manuscripts, most of which he must have intended to work over and print; for he planned 100 pages more. I have done my best to arrange the material, condensing as necessary. His recent notes on Opuntia can be found in "Desert", a magazine on succulents published in Pasadena. He probably intended to include his list of plants collected on a recent trip through Mendocino county and into Oregon, but it is impossible for me to include it. The rather long manuscript has been left at the herbarium of Pomona College with Dr. Munz, where it can be consulted by anyone interested. There also can be found his many books of manuscript of his unfinished "Flora of the Great Basin."

In these pages I have not tried to delete all of his caustic comments (although not assuming responsibility for them). I did not like to destroy so characteristic a flavor, which many of his correspondents evidently enjoyed; else why did they ask for more ? Those who knew him well, knew that his "bark was worse than his bite", that he would go to unlimited lengths of unselfish kindness to help or accomodate a fellow nature lover or scientist; but his own pride together with his hatred of sham, pretense, self-seeking, or domination sharpened the barbs of his criticism and sometimes affected his judgment. Perhaps some allowance or forgiveness may be granted him in appreciation of his remarkably keen mind, enormous fund of information, great versatility, his more than 50 years of wide and varied field experience and painstaking investigation, and his amazing vitality and determination, which made him continue his field trips and even the printing of his own books after the age of 82.

Mabel Jones Broaddus

(continuing NORTH AMERICAN BOTANY. See also Cont. 15:74; 12:82; 3:78).

About the time Pursh's Flora came out, there came to America a talented Frenchman by the name of Rafinesque, — a man with an exalted opinion of his own importance, who became the pest of American botany. He was three years older than Nuttall who was born in 1786. Nuttall was a high-strung Englishman, who became curator of the Har-

vard Botanical Garden and later on an instructor there. Rafinesque published his ideas in Silliman's Journal for years, till he wore out his welcome and began to publish himself the American Monthly Magazine and Neogemyton, etc., where he had no one to restrain him.

John Torrey, twelve years younger than Nuttall and a genial gentleman who had no enemies and many friends, was made professor of botany and chemistry at West Point and soon became the semi-official government botanist. After Lewis and Clark's Expedition to the Northwest, he took up the work of naming the collections of government expeditions.

Nuttall, who had named specimens collected by Wyeth, was eager to get into the great West, especially after meeting Wyeth and hearing him tell of his explorations. In 1833 he applied to the directors of the Harvard gardens for leave of absence to go on a trip with Wyeth, but was refused. This attempt to dictate to him so aroused his anger, that he promptly resigned and arranged with Townsend, a geologist, to go with Wyeth and explore. They outfitted at Independence, Mo. or Leavenworth, Kan., nearby, and started out afoot, carrying their packs on their backs.

Just what was Nuttall's equipment on that trip is unknown, but it must have been poor; for all of his specimens seen by me were mere snips such as a school-girl would take on a ride into the country and preserved in the same way, by being put into a book and left to blacken. After meeting Wyeth's party at Boneville, no doubt he was allowed to carry his luggage in the mess wagon, but his space was surely limited.

The trip began April 28, 1834, too early, Nuttall complained, for botanizing along the way until they got about to Independence Rock in Wyoming. From there on he was able to get specimens of the flora, particularly along the Green River west of the present town of Green River, at Granger on Ham's Fork, at what became Fort Bridger, and along the Bear River to the Pierre Meadows (now Soda Springs), where they feasted their animals on the rich grass. Then the road crossed a low range, down along the Portneuf River to what is now Pocatello, and down further to Fort Hall on the Snake River. There some of the party revolted and built the new Fort Hall 29 miles up on the Portneuf. There was a ford on the Snake River here which they used, going up Lost River and over the range to the Salmon River, which they followed down a way before going over to the Snake again below what is now Boise. Then they followed the Snake down near to the present Huntington, where they ferried across the river and went up the creek above Huntington to the divide leading down to what is now Baker City, where there were fine meadows for their stock. They continued down the meadows to what is now La Grande and there they went over a high range to avoid the box canyon leading down the river to what is now Umatilla. Here they reached the Oregon or Columbia River and followed it to Walla Walla, their destination. There the party broke up and Nut-

tall went down the river to Astoria. From here he sailed for California, finally reaching San Diego, where he remained for some time botanizing. He then went by boat to the Sandwich Islands and back to the Atlantic coast by way of Panama. This monumental trip was the most productive of new species and new genera of any of the transcontinental trips, and yet it did not cover more than one fourth as much territory as I have covered in my botanizing. But it was made by slow wagon travel, while I have traveled over Nuttall's route several times by auto or train through Wyoming and west, botanizing at critical places on the way, and visiting many of Nuttall's type places.

After this time the Government sent out many exploring parties equipped for botanical work. Gray, who was a pupil of Torrey's in the early days, naturally shared with Torrey the naming of the botanical material. Together they got out also the Report on the Mexican Boundary Survey.

When Nuttall returned from the west with all his collections, he deposited his types in the herbarium of the Philadelphia Academy of Science and was elected a member of the Academy and a fellow of the Philadelphia Society. He continued his relations with that body until his death. It is evident that he had some plans about getting out a flora of the United States, for in 1818 he published his Genera of North America, and in 1842 his Trees of North America. Just what was the cause of his hostility to Gray is not known, but professional jealousy was not unknown in those days when Rafinesque was making himself odious by his publications. The fact remains that Nuttall did not at all like Torrey and Gray's handling of his new species and genera in their Flora of North America. That Nuttall regarded Gray as an upstart was evident, for Gray was 24 years younger than he. Yet so far as I can find out Gray never entered into any controversy with Nuttall, but only with men who were younger than he. Gray was a savage partisan and did not hesitate to try to crush them.

In his later years Torrey deposited all his types in the herbarium at Columbia, which school was to become his botanical executor. The small fry who followed him frittered away their time in institutional jealousy against Harvard, being too cowardly to defy Gray, who had become a botanical dictator, looked up to by us younger men as the only authority in American Botany. We sent him all our specimens for identification until we began to see that his judgment of species was often erroneous, and began to publish names of our own for plants that we had collected. This caused his hostility and resulted in his trying to suppress us by shutting off our avenues of publication. While Gray lived, most of those who disagreed with him, kept a discreet silence. The two leading objectors were E. L. Greene and I. I ceased publication until after the death of Gray, but Greene, who became rampantly hostile and vowed he would devote the rest of his life to undoing the work of Gray, continued to publish in the California Academy of Science Proceedings and

later got out Flora Franciscana and Pittonia, a series of publications, followed by Leaflets, and other issues. He got Jepson to start Erythea, a Calif. Journal which held on for some years till it finally died from lack of support. Then Jepson started Madrona, a similar publication, which had a precarious life. Greene went insane before he died. Gray finally died of old age. His work was continued by Watson, his chief aide, and by B. L. Robinson, his successor at Harvard.

Very soon after Gray's death, N. L. Britton of Columbia began trying to dominate American botany. He enlisted the services of J. N. Rose of the National Herbarium, and between them they got out a revision of the Crassulaceae and Cactaceae at Britton's expense. Not long afterward Rose died.

Britton had started the New York Botanical Garden, from which he published Memoirs at various times, and at last began the publication of a flora of North America, enlisting the efforts of P. A. Rydberg, Curator of the herbarium, until Rydberg's death. Britton has certain peculiar ideas about species and genera that are not favored in America, and he has not ceased to try to throw discredit on the work of Harvard and of others who oppose him.

(This article was obviously left unfinished. M. J. B.)

NEW SPECIES

Nissoloides cylindrica (3784) *N. Gen and N. Sp. No.* 27223. Guadalajara, Mex. Nov. 27, 1930. In moist fields, creeping and rooting, with the habit of Desmodium. Stems filiform, 2-4 ft. long, with long internodes. Stipules green, rigid, nerved, acerose, 2-4 mm. long. Leaves small, 1-2 in. long, of three leaflets which are elliptical, 1-1.5 cm. long, thin, venose, rounded at both ends, entire and without stipules, puberulent, on a rachis about as long as the leaflet, the terminal leaflet about 2-3 mm. from the pair, darker above and veiny. Flowers in slender axillary racemes six inches long, and in fruit separated by about 1 cm. and subtended by triangular bracts 1-2 mm. long. Pedicels reflexed in fruit and 6 mm. long. Calyx about 1 mm. long, triangular in longitudinal section and with the triangular lobes as long as tube. Flowers apparently very small. Fruit filiform, 1-2 in. long, of six joints almost cylindrical but a little constricted at the joints, very slightly flattened laterally, longitudinally striate and very shortly crisp-hairy; each joint about 4 mm. long by 1 mm. thick, with rather prominent but not winged sutures, all alike; no wing on the terminal one but it is acuminate, shortly stipitate. Flowers absent.

NOTES AND REVIEWS

Filix Adanson Fam. This genus not having any species appended to it by Adanson, must stand on the first description of it by others where species were given with it. This would be that of Gilib. Exerc. 1792 where he describes Athyrium filix-foemina. This then becomes

the type of filix. So the contest is between filix and Athyrium as to priority and not with Cystopteris. Therefore Maxon's and Underwood's references of Cystopteris to Felix are unwarranted.

Nothoscordum striatum. This plant has much the same habit as Allium and the markings of the bulb are about as in A. Bolanderi or hyalinum. The bulbs when mature are about an inch long, ovate, and with the thin coats of the onions. At the junction of the base of bulb to the roots, bulblets are produced outside of the coats, are ascending and sharp-pointed, several of them to a bulb, and white.

Androstephium violaceum Torr. This has the same kind of propagation as Nothoscordum, but the bulb coats are thick and very fibrous with many vertical ribs.

In Coulter's Flora of Texas he left out the genera Cooperia, Crinus, and Zephyranthes on page 430. But he put them in the key on page 429.

Amsonia by Woodson. In this recent brochure things have been brought up to date and the species revised, but in my opinion, too many species have been recognized in the genus. There are in all probability few genera younger than Amsonia, and the so-called species are too confluent for good species, but the collections are as yet too meager for certainty in defining the proper limitations. I am sure that Amsonia brevifolia and tomentosa are only forms of the same species. The characters given by Woodson do not hold out. I have seen acres of them and studied them in the field fully.

The geological maps accompanying the brochure are open to serious criticism. Mr. Woodson does not pretend that the maps are his own, but says they are copied from sources which he considered authentic; my criticism is therefore not aimed at Woodson but at the author of the maps, who is unknown to me.

Any attempt to account for the origin of species geologically must as a basic fact have accurate information on the geology involved.

I have been an active field geologist for fifty years and have traversed most of the regions involved and studied them in detail, besides being familiar with the explorations and reports of Government geologists of the 40th parallel, the Grand Canyon of the Colorado, Wheeler's and Hayden's reports, and the geology of the Henry mountains. I have also been personally acquainted with the men, Emmons, Dutton, and Gilbert who did most of the work. I say without any reservation that the outlines of the continent in Cretaceous times as published by Woodson are wrong, no such areas ever having existed above the ocean level in those times. Later on I will take up this matter in detail.

It is natural to want to find the origin of species during geological time, but up to the present there is too little authentic material on which to work, and in addition, the paleobotanists who have described most of the species are not competent systematists, and their results are mostly

guesswork rather than established facts. I have had a chance to check up on the work of Knowlton and Ward on certain geological formations. Take, for example, Knowlton's work on the Tertiary flora of the upper Snake region. There are certain regions of exposures in which fine leaf impressions are to be found. Knowlton figured and described certain genera as Populus, Salix, etc., making numerous species based on those impressions. Now what competent botanist would dare to identify any species of Populus on the leaves alone, knowing the species as they grow all around him? And yet here is a paleobotanist who does not hesitate to name a species from the leaves alone. I seriously doubt if he even knew what were Populus and what were Salix species. No field botanist of today could identify certain leaves which I might furnish from Populus angustifolia and Populus dinorpha and tell even the genus to which they belong. When a person does not know the facts on which geological papers are based, he is inclined to marvel at the acumen of the botanist who did the work, but when he knows the facts he feels that the man is a grandstander and nothing more. In this cluttered up condition of paleobotany where will a man land who tries to find the origin of species of plants in geological time? It is a wild-goose chase.

In my work on Astragalus I made a serious effort to get at the origin of the genus in geological time. I found nothing worth considering prior to the Quaternary, glacial period.

Cactacae by Fosberg (Bulletin So. Cal. Acid. Sci. Vol. 39, Pt. 2) In his article Ray Fosberg makes a number of new genera out of various Cactaceae published in Britton and Rose's Cactaceae. That publication was a fiasco which has made the authors justly odious. It is a pity that Fosberg does not know more about generic limitations. What the Cactaceae need is not expansion but drastic contraction, and nothing but that kind of treatment will ever go with western botanists. A person who tackles Cactaceae at once invites contrast with the magnificent work on the family by Engelmann, the greatest of American botanists, and he must be a very great person to appear anything but a pygmy in contrast. It is not a question of getting into print with one's own ideas. Anyone can do that. Are his ideas worth printing is the question.

The author's Latin is rather raw, and his familiarity with Greek is nil, but he does not hesitate to coin a lot of Greek names as though he knew what they mean and what they are. This shows the foolishness of insisting that all new descriptions be in Latin.

Umbelliferae by Miss Mildred Mathias. I confess in looking over this very elaborate and exhaustive work by Miss Mathias that I do not like it. I would like to go through it critically and show up all its shortcomings, but personal reasons prevent. I must content myself with saying that she seems to have no sense of generic proportion, but follows, in the main, the meanderings of Rose in his treatment of the Umbelliferae, and

in keeping up on trivial grounds various genera that never had any standing. The author probably never had much field experience, but bases the work on herbarium material. A very small amount of field work would show her the absolute untenability of many genera, if she has any generic sense of proportion. Her sense of specific limitations is also weak, since she keeps up as species many varieties that any field botanist would recognize at once.

Since there has been such widespread opposition to Rose's treatment of the Umbelliferae, one expects a philosophical discussion of the basis of every genus; but Miss Mathias seems too timid to attempt it. I am amazed at her identification of Cymopterus lapidosus with C. longipes. It is quite a different thing, more like Cogswellia. C. longipes is a peculiar species, growing flat on the ground in early spring with a rosette of leaves and sessile inflorescence. As it matures the foot elongates and the pedicle also so that the flowers or fruit are a foot above ground. The root is tuberous and fleshy, while that of Lapidosus is quite different. So is the habit of the two. I notice a similar absence of critical judgment in C. Fendleri and Newberryi. I discussed them in one of my early papers (Cont. 4), showing the complete intergradation.

I do not favor the habit of recent monographers in citing a great mass of specimens. Doubtless this is done to give the appearance of profundity of study, but to me it is simply cumbering one's work with a useless mass of junk. I do not mean that her work contains any junk, but its chief lack is judicial treatment. One must know ecology before being a monographer in botany.

From private conversation with the author I find that her position in recognition of species is that if the variation is a marked one it should be considered a species irrespective of field conditions. This ignores ecology and puts a premium on freaks. The great herbaria are rapidly filling up with freaks, sports, accidentally collected, that have no standing in nature. *A species ought to mean a well established group of self-perpetuating forms.* When a freak is shown to be a freak, the name should be suppressed. Cases in point are Astragalus grallator Watson, Astragalus oocalycis Jones, and Astragalus hyalinus Jones. There is much duplication of forms in the Umbelliferi because of the varying development of wings according to the time of fruiting of certain species. It should be easy to give a good description of a well established species, and this description should be based not on the characters shown by the type specimen so much as on the plant as it is known to grow.

Our nomenclature practices are at fault in many cases in the matter of priority. It is the practice to recognize the first name applied to a species, and if variations of it are found later on, those go as varieties of the earlier species. But this practice is biologically wrong, for the reason that often the first name applied to a species was given not to the plant as it grows but to a variation, good enough as a variety, but not prevalent enough to warrant using the specific name for it. An example of

this is Astragalus lentiginosus, a name applied to a very local form of a cosmopolitan species. So Astragalus diphysus, a far more representative form, must go as a variety of lentiginosus, a case where the tail wags the dog.

It was imperative that a monographer of Cymopterus should take up my animadversions on the work of Coulter and Rose and show that my criticisms were incorrect, (See Cont. 12:96 & 13:17) before accepting those spurious genera. But Miss Mathias does not even mention the fact that any criticism of those genera ever was made, though she had access to all my Contributions, and knew of all my criticisms. This is why I assume timidity on her part about going into the matter. Unless my position is disproved I see no escape from rejecting the genera. That is why I should welcome discussion of it.

BOTANISTS WHOM I HAVE KNOWN

There is a woeful lack of information about the makers of the systematic botany of today,—the collectors and the writers on western botany. It has been my good fortune to have belonged to the middle period. Pursh and Michaux were gone when I began to botanize in 1875. Nuttall was still alive, though old. He died in 1859 when I was seven years old. Torrey lived until I was twenty, but he had dropped entirely out of botanical work. Douglas was dead also, and many of the smaller lights were gone. But the great men, Gray, Nuttall, Engelmann, Boott, Eaton, Watson were still building when I began to collect. Gray, who was born in 1810 (some nine years before my father's birth), lived through all the reconstruction period of botanical research from the Linnaean system to the present genetic system, having adopted the ideas of Bentham and Hooker in their Genera Plantarum, and their method of publication. As my own life has covered a rather long period, it has seemed fitting to me to add my mite to the records of systematic botany and collectors whom I have known personally or by proxy.

The engravings of Gray, Watson, and Torrey given in this volume were copied from the Botanical Gazette and the Torrey Bulletin. This one of Gray is to be preferred to that published in the Bulletin at the time of his death, which showed him a worn old man; this one shows his steely black eyes indicative of his fighting nature. (See comments about Gray and others in Cont. 16.) The photo of Torrey, issued by the Bulletin at the time of his death, reveals the kindly nature which, like that of Sir Joseph Hooker, endeared him to all whom he knew. The photo of Watson is from the Botanical Gazette. There is also a copy of this photo at the Pomona College herbarium.

WATSON

It is noticeable that in the articles published at the deaths of the three men, there is no tribute of personal friendship in the review of

Watson's life, just a cold statement of fact, nothing like the warm personal regard shown for Torrey.

Watson's meteoric advent into botany led many to ask about his origin. The records show he graduated from Yale in 1847, and was born in 1826, some 26 years before the writer was. He was a teacher in Iowa College (now Grinnell) in 1867, and was given the M. A. degree there about the time of my Colorado explorations in 1879. The absence of evidences of personal regard shows him to have been as unsocial as I have represented him to have been. (Cont. 16:47) As a botanist, however, he stood nearly at the top. No one but Engelmann has evoked as much praise from me as Watson.

DR. GEORGE VASEY

Another man whom we all admired for his worth, but whose caliber was not that of Watson, was Dr. Vasey, botanist of the U. S. Dept. of Agriculture, whose chair Coville has rattled around in. Vasey was a real man in every way, always prompt and reliable, giving personal attention to his work. There was no man in the profession for whom I held a stronger personal regard. He was always a genial correspondent, attending promptly to the many puzzling specimens of grasses I sent to him to name. In 1882 when I sent him the grasses I got in Mexico on the trip to Ensenada with Pringle and Parry, I wrote that I considered one of the species new and would name it later on. He must have shown it to Scribner, who was trying to be a grass specialist. Almost immediately I received from Vasey a letter urging me to publish my new species at once, before Scribner should steal it from me. I replied that no honorable man would do such a thing. But he did just that and called it Melica frutescens. This was the last letter that I received from Vasey. His assistant, L. H. Dewey, who, after his death, was to take his place in charge of the grasses, was pushed aside by Scribner, who remained in charge until he was removed. (Cont. 15:30) In 1894 when I was in Washington, Dr. Rose had as his stenographer, Miss Vasey, the daughter of the doctor. She was a very social person and, at Dr. Rose's suggestion, took me over to the Corcoran Art Gallery and showed me all around.

DR. J. N. ROSE

The lovable Dr. Rose (Cont. 15:30) was no field botanist but very conscientious. It was a pity that he and Rydberg allowed Britton to dominate them and so sacrificed what leadership they might have had among American botanists. I believe they both died disappointed. Rose was not a good systematic botanist, because he had poor judgment of relationship and no ecological training or experience worth naming. Yet in the superior manner of the National Herbarium he tried to suppress me by the weight of his opinion, when he wrote that he had no sympathy with my position regarding genera in the Umbelliferae. This

was really amusing, for without adequate ecological background his opinion could have very little weight.

C. G. PRINGLE

Supplementing remarks made earlier (Cont. 16:43) about C. G. Pringle, I will state that I spent 17 days at Guadalajara in October 1930. Rev. Howland was the minister of the Congregational church there when Pringle botanized at Guadalajara. I was much surprised to learn that Pringle made Howland's place his home for eight years while he explored the great Barranca and adjoining regions. Pringle endeared himself to the Howlands, who always speak kindly of him.

Mr. Wright a neighbor of mine here in Claremont who was a missionary at Guadalajara, Mexico, when Pringle was botanizing there, and with whom he stayed at times, says that Pringle was a true Quaker in his thinking and would never carry a gun nor kill anything. On his trips he would carry some cheese and tortillas for food and be gone a week at a time. He also says that during the great Rebellion Pringle was drafted into the army. When he refused to fight, he was tied to a post by some half-witted army officer and exposed publicly as a slacker. The people in Mexico who knew Pringle are all gone now with the exception of Prof. Puga a kindly old Mexican professor of pharmaceutical chemistry, with whom I had a pleasant visit.

Pringle missed many species that grow in that region, some of them new. A person who spent eight years in a region should have got the entire flora. It has been interesting to check up on Pringle and see how many of his plants I collected in my short stay in that botanical paradise. My study of the flora of Guadalajara which I secured in 1930 has now progressed to the point where I am justified in saying that my earlier criticism of Pringle for being a poor field botanist is fully justified.

D. H. HILLMAN

One of the best botanical artists in the profesion was D. H. Hillman, professor of botany at Reno, Nev. He was another very capable man who was lost, submerged, in an unexplained way in the Dept. of Agriculture. Everyone knows of the jealousies that prevail in the departments at Washington, but no one yet has had the courage to expose the persons responsible for swamping such good men. I have a very strong suspicion as to the guilty ones. Nothing but a thorough investigation of the government departments, such as we hoped for from Theodore Roosevelt, will ever right matters. There never has been to this day a man in the presidential chair pledged to a real house-cleaning.

P. A. RYDBERG

On July 25, 1931 there occurred the second tragedy in American botany, the death of Rydberg before his time, the first tragedy having been the death of J. N. Rose. Their disappointment at the treatment ac-

corded them by the botanical public was, however, partly their own fault; for no one has a right to subordinate his own judgment to that of another, as I think they did to Britton's, for the sake of financial support.

Rydberg was a kindly Christian man, well liked by those who knew him best. He was capable, sloppy, and a mule. I say "capable" because when he really settled down to work on a thing he could do it well. I say "sloppy", because he was too much inclined (like Stanley) to rush through a thing before he had looked on all sides of it thoroughly, and so made many blunders. I say "a mule", because when he was criticised for his faults he set up his back and stuck to his errors like a mule, instead of acknowledging them and changing his course. This is particularly evident in his silly Astragaloid genera. He was almost as bad a splitter as Greene, characterizing most of his species on single specimens without taking into consideration well known ecological factors, and without attempting to collect the intergrading material in the type localities of his proposed species. He had no conception of genus, and a very poor one of species, and no conception of the effect of ecological conditions on species. How anyone could be a botanist and neglect these things is a mystery. Rydberg's first work, on Potentilla, was to me his best. He made too many species there, but the work was good in the main.

There was a time in his early years when workers in the Bronx began to swell out with what they considered justifiable pride at his wonderful insight and deep and original studies, but I punctured this bubble by showing that all his so-called original work was simply giving new names to things that were discovered and published before he was born. Since that time we have been spared any more of this bunk.

Rydberg was inclined in his later years to consider himself persecuted. I never knew that he had any personal enemies. Nor do I think any one ever got after him for personal reasons. I certainly never did, though once or twice I had some reason to feel that he had not treated me fairly in private correspondence. In one of his comments on my species, he refers to having seen my type material, in order to strengthen his comment on it, but at that time he never had seen any of my types nor ever asked to see them. Only once did he ever call on me and that was just a social call in Salt Lake City. I was always willing to let anyone look at my types but I never loaned them to anyone, for the reason that Britton had refused point blank to loan me any Astragalus material in 1895, which necessitated my taking a special trip east in 1897 to see types, at great cost to me. At that time it was a general rule not to loan types, but this has been modified since then. I still feel that it is too risky.

ON DOMINATION

I do not wish my drastic comments on Brittonianism to give the impression that I am fighting Britton. That is merely a convenient term for that type of standardization which was first put into concrete form by Britton, and used to hide his real intent, namely to dominate American botany. There never can be any real freedom, intellectual or otherwise, until men are relieved from the threatening domination of the higher-ups; this is what I have been fighting for. We see the sinister results of this spirit in the somersault of L. R. Abrams in his second edition of the Flora of Los Angeles. It is also evident in the monographs put out by students working for their M. A. and Ph. D. degrees. These monographs too often represent not the opinions of their ostensible authors, but those of the professors under whom the students worked. I have often asked such persons why they do not take an independent stand and express up-to date ideas. Their reply is always the same: "I would not get the credits I am working for if I antagonized the professor." So everywhere we find servility to the detriment of scientific research. This I consider the most vicious tendency of today. J. N. Rose told me in 1895 that he considered it more important to have a chance to work than to stick for any special form of nomenclature. This was when the fight was on against the beginnings of Brittonianism. So as the years went by, he became more and more a slave, till he lost all sense of proportion, and his critical judgment was impaired.

The only objection to my criticism of the botanical dictators which I have received (I received many grateful expressions of approval) came from a woman who did not like me to write "mean things". I should be duly squelched, but, like the Irishman's turtle that still wiggled its tail after its head was cut off, I am "dead but not sinsible of it". I do not wish to be spiteful at all, but I do approve of frankness, honest criticism, and independence. I have chosen to attack the dictators by ridicule because they are impervious to argument. When people make so much fuss about priority as they have made, and then deliberately adopt "once a synonym always a synonym", and brazenly relegate to oblivion all the names of families like Coniferae, Leguminosae, and Compositae because they are not founded on genus, nothing but ridicule will get under their elephantine hides.

FREEDOM AT POMONA

Such domineering intolerance in scientific work is not necessary at all. Here at Pomona College, where Dr. P. A. Munz is head of the botany department, the scientific branch centering in Crookshank Hall forms a kind of patriarchial family, in which we cultivate individuality and the growth and development of personality, and frown on the subterfuges of society such as false dignity, etc. There is a sort of freemasonry that is very enjoyable. The girls especially are addicted to do-

ing their own thinking and expressing their opinions, which are genuine even if not always complimentary to the older heads. I have had enough experience as a teacher to know that any attempt to dominate people is fatal to progress. It is not quantity but quality of work that counts. To be sure, there is much waste in getting quality, but there is waste in all progress,— the scrapping of the effete. Probably this is the reason for the death of the aged. We get too hide-bound by our traditions and environment.

THE YOUNGER BOTANISTS

It has been my pleasure to meet in recent years many of the younger generation who are coming along slowly picking their way to efficiency in the school of hard knocks. Among them are Johnston of Harvard, a former Pomona man, Prof. Cory of Texas, Prof. Cottam of Utah, Miss Mathias of the Missouri Botanical Garden, and others. I have also found much pleasure in association with the members of the Los Angeles Nature Study Club, and with members of the Cactus Society which issues Desert, one of the best publications on succulents. In fact, I have been amazed at the number of capable women in southern California who are doing botanical work. So, in spite of the recent eruption in systematic botany, there is much hope for the future. There are many younger botanists coming along, with some of whom I have worked on intimate terms in the last few years, whose places are yet to be made. Among them are Vesta Newsom, Martha Hilend, Elizabeth Crow, Helen Sweet, Tom Craig and Ray Fosberg.

If I were trying to be giving a fair estimate of the botanical work done during my time, I should have to go into the work of Trelease, Miss Alice Eastwood, Piper, Thornber, Conrad, Nelson, Rydberg, Payson, Pennell, Munz, Johnston, Hillman, Dewey, Holm, Elrod, Setchell, and possibly others, — work which I shall never be able to do.

DR. WILLIAM A. SETCHELL

[Inasmuch as Prof. Jones had had a cut made of Dr. Setchell to put into Cont. 18, it is evident that he intended to write something about him. I can find nothing, however, except remarks made in personal letters to me. When, in 1932, Father was in Berkeley at the University Herbarium for many weeks working on the identification of his Mexican plants, Dr. Setchell persuaded him to stay several weeks longer in order to dictate to a secretary furnished by Dr. Setchell the story of his life, especially of his scientific work. He had promised to write it out himself long before but never seemed to get around to it. Mrs. H. P. Bracelin laboriously took down in long hand his rather scattering reminiscences. Father thought a great deal of Dr. Setchell, often speaking of him as "a prince of a fellow" and a fine botanist, — superlative praise from him. — M. J. B.]

HOW I BECAME A BOTANIST

I have often wondered why we do not know more of the early days of the older botanists. So far as I know, there is hardly a word said about what led men to become botanists, or naturalists. I have even asked older men to tell us of their earlier days. What a fund of interest could be unearthed as to incentives, early influences. But these men will seldom talk or reveal anything, perhaps from modesty or because they cannot imagine that anyone else would be interested or helped. How I should like to know why Torrey, Nuttall, Pursh, Gray, Engelmann, Watson, Brandegee became botanists ! When I urged Mrs. Brandegee to write about her life work, she turned to me in disgust and blurted out almost savagely, "What does the world care for me ?" The world cares much more for us than we care for it.

In my own case, I feel that I can trace the events and influences that led me to be a botanist.

First and foremost, I had an angel mother. I flatter myself that there never was another like her. She was a little, frail woman, but pure gold; never quarreled, never fretted, always an optimist. She lived for us seven boys and my sister. Her ideals were high. In the first place, moral cleanliness was our obligation to God. Futhermore life was a magnificent opportunity as well as an obligation to utilize all our powers, mental and physical, for the benefit of the world, and not for personal gain. And also to her all the wonderful adaptations and machinery of plant and animal structures were illustrations of the infinite care of the Creator for his creatures. She loved flowers and always had on the mantle a fresh bouquet that she had encouraged us to gather for her.

When we were very little she told us of the funny Dutchman's breeches (Cucullaria), the squirrel corn (Dentaria), the bloodroot with red sap (Sanguinaria), the ground nut, good to eat, (Erigenia), the squawberry with the little red berries hidden under the snow, the trailing arbutus, (Epigaea), the beths (Trillium) the moccasin and lady's slipper (Cypripedium), the golden rod of the fall season, the gentians, and the asters. All these she pointed out and named for us as they bloomed. She was always delighted to have us bring her freaks of nature, odd and unexpected forms. One day we boys came across some tree roots that had crossed and grown together. None of us had ever seen such a thing before. So she told us to show it to Mr. Olds, the minister. This is one of my earliest remembered introductions to nature study.

My father owned a sawmill and taught me all about lumber,—how to tell the different kinds of oak, hickory, ash, maple, and birch. He was a fine woodsman and a great lover of animals. On nutting expeditions and at "sugaring-off" parties in the maple woods I absorbed much of his knowledge and love of the out-of-doors.

For the sake of better influences for their large family, Father and

Mother decided to sell the old mill and move to Iowa some five miles east of Grinnell on the pristine prairie; and here I grew up from my early teens on the wonderful prairie. Everywhere were flowers in the spring and summer time, all of them strange except those growing in the natural grove a mile east of us. The niggerheads (Heliopsis and Eryngium) we used to flip off with our whips as we drove along. There were sunflowers, rattlesnake weeds with prickly heads (Eryngium), the compass plant (Silphium) whose leaves pointed north and south, the blazing button rods (Liatris) of different kinds. In the sloughs (wet places) we used to find many asters and gentians. Then there was the prairie apple (Astragalus crassicarpus), and in the thickets the lady's slipper (Cypripedium), Habenaria, Spiranthes, etc.

To get an education was part of Mother's religion; so, of course, I went to college, walking five miles back and forth. In the worst weather I boarded myself in town. Grinnell was a small college with half a dozen devoted professors, mostly ministers. Some of them were great men (such as Dr. Magoun and Prof. Macy), but none of them looked upon science as anything but an educational freak. Education meant proficiency in literature, languages, and religion. I became proficient in Latin and Greek and studied Sanskrit. I also knew some French and German. All this time my recreation was with wild flowers. My mother was always spurring me on to know more about them. I never thought it any work to study flowers; it was just a part of my life. There was no one else at college who knew as much about them as I.

The only botany text-book I knew was written by Mrs. Lincoln, who used the system of Linnaeus and who tried to describe the flowers of the middle United States. The descriptions were brief and inadequate, and the genera were arranged not in families but in the order of their stamens and pistils. Everywhere were such names as Syngynesia, pentandra, tetrandria, polyandria, etc. For some years, with the help of my mother, I tried to identify plants by Mrs. Lincoln's Botany.

In my senior year in college I used Gray's Manual of Botany and his Lessons in Botany. Our Professor of Natural Science, H. W. Parker, was a scholarly minister, devoted to building up a great museum at the college, but botany was of little interest to him. Our teacher was the Lady Principal, Miss Ellis, an old maid who had traveled in the Holy Land, had been to Rome, and had brought home a few scraps of plants clutched as she went along past old ruins. I remember her giving me a specimen of Asplenium ruta-muraria from the Colosseum. She was a lover of flowers but had no training in botany and never did really identify a dozen plants by analysis. So it was up to each student to get the names the best way he could. There was always a conflict of authority as to what was the real name for a plant.

Thomas T. Baker and A. O. Hart, who had graduated the year before me, were really trying to name our Iowa flowers. Both of them had considerable skill, and were very helpful to us when Miss Ellis got

beyond her depth. After my graduation, I was so exhausted from over work and undernourishment, that it was not long before I fell a victim to a slow fever that incapacitated me for work and left me a perambulating wreck. To keep my mind occupied I rambled over the hills and prairies, collecting plants and trying to name them. That fall I had 625 species.

During the following year of post-graduate study at the college, where I was also a Latin tutor on the faculty, I met J. C. Arthur, a protege of Bessey at Ames, who visited Grinnell to find out if any of us were doing botanical work. The acquaintance begun then lasted all through the years. A year later he published a list of Iowa plants, both native and introduced, and among them he mentioned a few which I alone had found.

About that time I began to correspond with Dr. Engelmann of St. Louis, who named many plants for me. Then, at his suggestion, I wrote to Gray, Watson, Wm. Boot, and others to aid me in naming our plants. Gray was efficient, careful, and genial. Watson was as business-like as a phonograph and about as cordial. Boot was right there with all his names and a pleasant correspondent. Engelmann was very efficient and genial. I found something especially attractive in the personality of Pringle, just as I did later in that of Dr. Kellogg, Cusick, Mrs. Brandegee, and Mrs. Austin.

About that time an Austrian gentleman in Europe wanted me to gather the flora of the Great West and send him sets to sell. My disgust at the thought of spending my life teaching Latin, and my poor health, which demanded an out-door life, conspired to suggest my becoming a real botanist. More and more the idea obsessed me, until I decided to take my life in my hands and go to the wild and woolly West.

MODERN AND EARLY BOTANIZING

Botanists of today wonder how men did their work in the early days. Insufficient funds and the conditions of travel were great handicaps to the collector. One could never carry enough materials or equipment to make fine specimens. The Lewis and Clark expedition had to use canoes made by hollowing out logs with axes. There was much danger in going through rapids and always the risk of having everything splashed with water. When not boating they had to carry their loads on their backs at the portages. In those days they did not even have old magazines to use for a temporary press, as the modern woman traveler does. About the only paper available was the rough brown wrapping paper that we used to call butcher paper, which was of about the consistency of the coarse modern paper towels. This paper was about three feet wide and was folded four-double to about the size of an ordinary magazine and tied up in packs. Then the botanist gathered snips like the modern school girl's, slipping them into the pack as he had

a chance and leaving them tied up till they either dried or molded and rotted. The necessity for drying them properly was not even considered. Whether Nuttall ever made any decent specimens I do not know. All of his that I have seen showed the inadequacy of his equipment, for they were blackened in the drying and almost worthless. But they are all that are left of his many types. They have been mounted and arranged by Thomas Meehan. I was able to examine his Astragalus material in 1897.

No doubt Freemont's trips across the continent were made on horseback and with limited space for specimens. This was in the early forties. Practically all the types taken on Government surveys were collected in the same way. Wagon roads were not available in those days, for buffalo trails were the only roads.

My own experience with making specimens began in the early seventies, some thirty years after Nuttall's time, when wagon roads had been made by emigrants all over the west, and when transcontinental railroads had just been built.

When I began to get ready for my first trip to Colorado, I had the benefit of advice from all the old ladies and old men who never had made any such trip. I was told to wear the heavy cowhide shoes that the soldiers of the Rebellion wore in the war and to have the soles filled with hobnails to enable me to climb the mountains. Also following their advice, I took tissue paper to put my specimens in but found it a nuisance . For driers I bought butcher paper and folded it in about four layers to make driers a foot wide and a foot and a half long, sewing the layers together around the edges. At that time some wise guy in the east had evolved a theoretical drier out of felt cut to the regular size and one quarter inch thick, and sold them at a reasonable price, which was, however, altogether out of my reach. Then another wise guy had evolved a wire press with clips on the corners and wire chains to tighten up as the specimens permitted. The top and bottom of the press were made of band iron riveted together at the corners and with wire laced through holes punched along the sides. This press I used as a portfolio to carry with me in the field. For a press I used boards, tying them up with ropes. When in camp I put a heavy board and a stone on top to keep it tight. This was my equipment in 1878.

Since I walked about 15 miles a day botanizing, my cowhide shoes became a nuisance, although they stood the wear and tear of walking all right, and lasted me all summer. The exertion of lifting them at each step took so much energy that I was tired out every night, but, being young, I did not realize what was the matter. When the weather was wet or cold they were very uncomfortable. In the Death Valley region I wore my old cowhide shoes one year but found that the hobnails fell out of the blackened holes in the leather as though burned out. The heat of the ground was such that in walking from Ballarat to the Panamint Mountains one day I actually had to sit down on the ground and hold my feet up while the soles cooled off.

It was Nuttall's habit to tear off a little piece of paper and put it in with the specimen showing the locality and date. I used this method in the first year of my botanizing but discarded it for specimen books in which I placed a fragment of the plant together with all data written in pencil and the specimen sheet number. These books I made of sheets of specimen paper folded double with edges cut and holes punched in the folds through which I passed strings to tie up about 400 pages together. I covered each book with oilcloth. This was my method when I was making sets for distribution. If my memory failed me, I could look up the number to determine the data for each specimen. In later years when I was not making sets, I wrote the data on each sheet separately to avoid errors. I do not favor carrying note-books with numbers for each specimen gathered, for it takes too much time and work in the field, and the less field work the better.

In my work in the Grand Canyon for the Government in 1894, I was instructed by Coville to use the note-book method, but I disregarded it for my own way, and when I got to Washington I had a row with him about it. In one discussion with me he snapped out, "You and Greene are the two most conceited men I ever saw!" I did not reply to this, but wanted to ask, "How about the man you see in your mirror?" I had had about twenty times as much field experience as he, and did not care to adopt a method already proved inferior in the field. There is too much danger of losing your note-book in the field (as I did once in Mexico) and being left completely at sea, all your work worthless without your data.

When tennis shoes came into vogue, I found that their lightness was a great advantage, so used them altogether. A heavy-soled pair will last six weeks, cost less than half as much as leather shoes and weigh only a fourth as much. They are unsurpassed for climbing rocks and are undesirable only in rock slides or swamps.

A I began to use my reason in the light of my own experience, I discarded a lot of foolish equipment and evolved what was usable and inexpensive. In place of a trowel or butcher knife to dig up plants, I had a blacksmith make me a light pick with one end made into a blade one and a half inches wide, each end being only six inches long. Into this I inserted a small pick handle three feet long, so that I could reverse it and use it for a cane in climbing. I had early learned that to make good specimens I must dig up the whole plant, fold it skillfully to fit the sheets and still look life-like. With this pick I could easily get any ordinary plant with one blow, or I could use it to kill snakes, if I saw any.

In the eighties when I was botanizing in Arizona, I had the old time driers and often had two piles of drying plants four feet high. To change these, spreading wet driers out in the sun and putting in new ones, took four hours of the most strenuous work, sitting in the hot sun at noon and shifting the sheets from one place to another, although it

took but a few minutes for the driers to dry in the baking sun. It had to be done daily to prevent specimens from moulding or turning black.

For driers we now use double-faced corrugated cardboard cut into sheets 12 by 18 inches. When tightly strapped down, they seldom need changing in the usual weather of the deserts, if the bundles are kept out in the sun and wind. I have gone for weeks without changing these driers. It is best to keep fleshy plants (such as succulents) in a spearate press with extra driers and for frequent changing. I usually take along 300-400 driers for a trip. When the weather is wet there is nothing to do but change driers even if they have to be dried over a fire, which is a long and tiresome job. But in all my botanizing I have had to dry my driers over a fire only three times.

I found that any rigid press lets the edges wrinkle in drying, while the center gets too much pressure. I make the finest press imaginable as follows: I buy No. 14 tar-board (now called binder-board) from a book-binder, have it cut 12 by 18 inches and cover it with oilcloth cut 4 to 8 inches wider all around. I cover the cloth side with Le Page's Glue, lay a tar-board in the center of the cloth, pressing it down tight and folding the edges of the oilcloth over (corners cut out) on the back of the tar-board. I keep them under pressure until dry. I take 4 to 6 of these heavy covers along for presses and I use straps made of sole-leather cut six feet long and two inches wide with holes punched two inches apart and with a heavy buckle on one end. A bundle of driers with a tar-board cover on each side and one of these straps around each end of the bundle makes a good press. I sit or kneel on the bundles and pull up the straps tight *daily*. For several years I carried a collecting-can with a tight lid, but now I use two of the prepared tar-board covers for a portfolio to carry along in a shawl-strap with plenty of paper sheets to put specimens in. For specimen paper I buy unprinted newspaper cut 23 by 18 and folded in quires to fit the driers. I take along 2 to 6 quires for a trip and strap them up in the portfolio without driers. As soon as I get any plants, I sit down on the ground, open my portfolio, take out a sheet and write on the lower left hand corner the date, locality, and any other notes about color or flowers, etc. Then I lay the specimens on the right half of the open sheet, arranging them so that they do not touch each other. Then I fold the left half over the specimen, and lay a fresh sheet on top, continuing until all are in. If specimens are put in fresh, the flowers and leaves usually lie flat and lifelike, with only the occasional special arrangement of a leaf. I pile the empty quires of paper on the filled sheets, strap up my portfolio, and trot along for another picking.

When I get all the plants for that trip and go back to camp or home, I transfer all filled sheets to the press *without opening the sheets,* placing a drier over each sheet. I never open the sheets till dry for fear of crumpling delicate parts. Usually plants will dry in three days to a week. When dry, the sheets will feel warm to the touch, not cold. Then they can be taken out of the press, stacked in a pile and strapped up in an

empty press. But be sure the stems are dry. If not, put the few damp sheets, tied up tight, out in the sun for an hour or so.

My sixty years of experience have taught me that to do the best botanizing, you must travel light, with the least possible toggery. So I take a first-class post-card camera, a strong tripod, a color screen, a fine field-glass, a barometer, a pick with long handle, a pocket folding Coddington lens, a heavy pair of overalls with plenty of pockets, a wool shirt, a cork hat, heavy socks, and tennis shoes, and I let the dudes have the rest. If it is very dry and the foot-trip long, I carry a small canteen.

Don't let anyone fool you by saying that any one way is the only way of doing things. Use your own horse-sense. If you can make good specimens standing on your head or dragging heavy boots, then do that. Results are what count. I find it best to do my routine work with the least possible effort, saving my energies for more important things, and so at over 80 years of age I am still climbing the mountains with the young folks.

MARCUS E. JONES, A. M.

BIOGRAPHICAL SKETCH

Marcus E. Jones, always called Prof. Jones by his friends and acquaintances (because of his many, though intermittent years of teaching), was born in Jefferson, Ashtabula County, Ohio, Apr. 25, 1852, of old Yankee stock, his ancestors having come to America on one of the later trips of the Mayflower. His mother was Lavinia Burton, a sister of the late U. S. Senator Theodore E. Burton of Cleveland, Ohio. His father was Publius Virgilius Jones, a lumberman and a local captain of militia. His grandfather, Judge Lynds Jones, had been a pioneer in Ohio; his father pioneered in Iowa (when Prof. Jones was a little boy, his family were moving west on the very day that Lincoln was shot); Prof. Jones himself went, in young manhood, to the frontiers of Colorado and Utah and the far west, and his last few years found him still "roughing it", exploring Lower California. Some of his botanical friends speak of him as the last of the great pioneer, exploring botanists.

In spite of poverty and hardships, Marcus Jones graduated from Iowa College (established 1843; now Grinnell College), with the degree of Bachelor of Arts in 1875. After three years of post-graduate work while teaching Latin and Mathematics, he received his M. A. degree with high honors in 1878. He had previously won medals and prizes for fine scholarship, and years later, when a Phi Beta Kappa chapter was organized at Grinnell, he was elected to membership and awarded a key, which he wore with much pride. He had received an unusually thorough classical training in Latin, Greek, Sanskrit, and Anglo Saxon as well as being familiar with German and Italian. And yet he was not a natural linguist and found that he detested teaching Latin, although he proved to be a very successful teacher. Science was his hobby and exploring his joy. But practically all training in these things he gained for himself after college days were over.

He spent the entire summer of 1878 exploring the mountains of Colorado and collecting 1100 different kinds of plants, which he studied and named the following winter with the help of his correspondents, Vasey, Gray, Watson, Morong, Boott, and Englemann. He also taught Botany in his home college part of the time.

The next year he substituted for the regular professor of Natural Sciences at Colorado College and there received the title of "Professor" which clung to him all his life. Here began a life-long friendship with Gen'l Wm. J. Palmer, Pres. of the Rio Grande R. R., who later employed Prof. Jones for 20 or 30 years as his personal explorer and geologist, and who financed a number of his publications. It was about this time that Prof. Jones discovered that he was very near-sighted, and for the first time donned glasses, which "revealed a new world" to him, as he said. During the following summer and fall Prof. Jones botanized in

Utah, returning to Iowa to prepare his sets of plants for shipping to Europe. There, Feb. 18, 1880, he married a former college-mate and pupil, a very beautiful girl, Anna Elizabeth Richardson, also a Phi Beta Kappa scholar and at that time Acting Dean of Women. Together they set out at once for Salt Lake City, where they spent the rest of their married life. Mrs. Jones was much interested in botany as well as being very artistic. She accompanied him on some very difficult trips and helped him make many souvenir booklets of wild flowers, which they sold.

For one year Prof. Jones taught in Salt Lake Academy, one of the two "Gentile" high schools there, and from 1881 for eight or nine years he and Mrs. Jones conducted a private high school and kindergarten for non-Mormon children. Mrs. Jones was a remarkable teacher, and frequently, even in later life was persuaded to do tutoring.

During these early years Prof. Jones made many long botanical trips through California, Nevada, Colorado, Arizona, and Utah, and even as far as El Paso, publishing his findings in the Torrey Bulletin until they refused to publish any more unless first submitted to Asa Gray for his approval. As Prof. Jones felt that he knew the western flora better than Gray, he refused to do this and ceased publishing for some years, later sending his articles to Zoe until he decided to publish them himself. He continued to send sets of plants to Karl von Keck in Austria for European distribution and received 20,000 European specimens in return. It was von Keck who had Prof. Jones' "Excursion Botanique" published in Liege, Belgium, by E. Morren about 1879 or 1881.

In 1889, Prof. Jones was engaged by the president of the University of Utah (then practically all Mormon) to organize the university library and install the Dewey system.

In 1890 he was engaged by Gen. Palmer to explore Arizona and report on the feasibility of a railroad route from Tucson to Salt Lake City. This trip was made by team and horseback at about 30 miles a day in temperatures around 125 degrees, but Arizona was a garden of flowers and yielded many valuable specimens for his herbarium.

The next spring, 1891, he conducted for Gen. Palmer an exploring party west across the desert to Cherry Creek, Nevada, from Tintic, a big mining camp west of Goshen, Utah. He explored and sampled all the mining prospects (botanizing as he went) around Omega Mts., Dugway, Fish Springs, Ibapah, Deep Creek Mts., Dutch Mts., Gold Hill, Clifton, Gencoe, Aurum, Shell Creek Mts., Sprucemont, and Antelope Spring. That winter he set up a complete laboratory for assaying, and employed two expert chemists, E. P. Austin, who was also the creator and owner of "Psyche", the leading entomological journal in North America, and Victor C. Heikes, who later became the head of the U. S. Geological Survey in Salt Lake City.

In the spring of 1892 Gen. Palmer telegraphed him to go to Mexico to examine the Sierra Majada, Zacatecas, Guanahuato region and the

properties along the Mexican National R. R. from Irapuato to Manzanillo. He received every courtesy from the ranch and mine superintendents and botanized wherever possible without delaying the party too much. By train, stage-coach, and burros he went from Mexico City to Colima, past its active volcano and even to some mines in the jungle. He collected 782 numbers on that trip, including 40 or 50 new species.

In 1893 he explored Nevada again, owning and operating a mine until the disastrous drop in silver that year. In 1894 he was appointed field agent of the U. S. Gov't to explore the Grand Canyon of the Colorado. He spent the following winter in Washington, D. C. labelling and identifying the 4400 plants collected. As usual, he did not charge enough for his services. The salary he received did not cover half of his expenses. The report of this work is in his Cont. No. 7.

For the next few years all his time was spent on his monograph Astragalus except for mining and business trips necessary to earn a living. One trip was made to San Francisco, followed by much botanizing up and down eastern California and up into Oregon. In 1897 he also went to Philadelphia to photograph the types of Nuttall's Astragalus and on to Harvard and Columbia for more photographs.

An appointment as geologist for the Pacific and Idaho Northern R. R. in 1899 enabled him to explore that part of the country, and later in the year he was made Special Statistical Agent of the Dept. of the Interior to publish a book on Utah. For many years he was State Geologist of Utah, keeping an accurate record of the water level of Great Salt Lake, as well as many charts of the water-level of various irrigation districts.

When the first case of smelter smoke damage, the Evans case, was tried in Utah, Prof. Jones was put in charge of the expert work. The smelters had so much power that no local decision was rendered, but the case was won against the smelter when carried to the U. S. Supreme Court, and the smelter was closed, dismantled, and sold at a great loss. Prof. Jones who had gained quite a reputation as a mining expert and had been employed to examine and assay many properties, used to say that his responsibility in the Evans case caused him to be boycotted by the mining interests for several years. But he never consulted his own interests when it was a matter of right or duty.

Before long the Mormon farmers, realizing that he was fearless and incorruptible, beseiged him to fight their damage cases, and he "was swamped with business until 1910". He fitted up a chemical laboratory in the basement of his house, made a thorough study of modern chemistry by himself, collected and analyzed his own specimens of injured animals and vegetation and then served for weeks at a time as expert witness at the trials. He gloried in a battle of wits, especially when championing a just cause ; so he was in his element on the witness stand But he was nearly 60 years old, and found the nervous strain "terrific". It pleased him greatly to win his cases even though the opposing expert for the smelters was a university professor of chemistry. The smelters

were forced to install the "bag house" to solve the problem of smoke damage.

He spent two and a half years as botanical expert in Montana in the great suit against the Anaconda Copper Company of Butte for smelter smoke damages. Among his effects were found many scrap books of photographs taken as evidence in this case. While botanizing throughout Montana, he became a personal friend of Prof. Elrod of Montana University at Missoula and was invited to teach botany and geography at the summer school at Flathead Lake. For three years he spent six weeks there during July and August botanizing all over that country, including Glacier National Park. The results, "Montana Botany Notes", were published by the university. At Prof. Elrod's request he devoted a year to writing up the Flora of Glacier National Park, illustrating it fully with photographs; but the university regents finally refused to publish it on account of Prof. Jones' opposition to the Anaconda Copper Co., which controlled everything in Montana. In some of his autobiographical notes, Prof. Jones says that Prof. Elrod offered to have the university honor him with a Ph. D. if he would establish residence at the university for at least a month, "but I told him it wasn't worth the time."

As a relief from severe mental application on scientific problems while in Salt Lake City, he played chess and checkers and filled many notebooks with intricate analyses of all the known plays and leads in checkers. All of this manuscript together with his rather complete library of information on the game is in the Pomona College library. One of his checker "cronies", Junius Smith, a Salt Lake attorney and former state checker champion of Utah, wrote of him: "J. C. Harrop told me that your father was the one man he knew could beat him. Harrop is the Ogden Utah, expert, and is one of the finest players in America . . . Harrop and I were fully cognizant of your father's playing ability when he really put his mind to it . . . As a rapid player, I never saw his equal. In match contests, however, . . . the strain was greater than he cared to undergo, and he seldom did so. But I have seen him do it, and he has won games from me when I was in top form."

Probably it was his intense intellectual curiosity and pride that led him to say often, "What *has* been done, *I* can do." He liked to prove to himself that he could do any difficult thing as well as a specialist in that field; but he did not have a high enough regard for the great perfection of technique necessary for ultimate success.

It is impossible in this brief sketch to mention all the botanical trips, several each year, which Prof. Jones made, from British Columbia to South of Mexico City. He planned as his life-work to publish a "Flora of the Great Plateau". At Pomona College are stored his many Note-books bulging with manuscript; but ill health, field trips, insufficient funds when he had the health, and other interests prevented his completing the revision of more than two thirds of it.

In September, 1916, Mrs. Jones died, after sixteen years of strenu-

ous effort to carry enough of the family financial burden to enable Prof. Jones to finish his life-work. All three children had graduated from college and were either married or teaching. Prof. Jones had only himself to support but was faced with the problem of housing safely his vast herbarium during his long absences. For a while it was stored at the University of Utah.

By 1920 the manuscript of his revision of Astragalus was practically finished, but he was financially unable to publish it until 1923, when he sold his huge herbarium to Pomona College. During the preceding years of anxiety he had tried many ways of earning money. He wrote many short articles on interesting experiences he had had and sold some to various magazines. He could probably have sold more if he had not been too proud to enlist the criticism and revision of some one skilled in English composition. His writing showed much originality and pungent expression but it was carelessly constructed and poorly organized. He also enlarged and colored by hand some of his choicest photographic views and sold many of them. But extravagance in taking pictures and carelessness of finish prevented that from being a very successful venture. He certainly spent many thousands of dollars in his lifetime on cameras, slides, color-photography, enlargements, etc. He even experimented with zinc etching. At his death he had hundreds of plates taken 30 or 40 years ago, of beautiful scenery, plants, geological formations, mines, and people. Many that were of especial scientific interest were left at Pomona College. Others are at Stockton awaiting suitable disposal. Anyone having good use for them should make it known before they have to be destroyed.

When not on field trips, Prof. Jones "kept fit" by tennis-playing and ice-skating, at both of which he was quite an expert. The tennis he kept up in a little club of men at Pomona until he was 80 years old. At Pomona he also took great pleasure in the informal meetings of the Afternoon Club, made up mostly of brilliant and interesting men who had retired from their former activities. He greatly enjoyed various Nature Clubs, especially the S. B. Parish Botanical Society, often traveling a hundred miles or more in order not to miss one of their trips. On one of them his last day was spent.

In 1925, when he was 73 years old, he returned alone to Grinnell, Iowa, in his old 1916 Ford to his 50th class reunion, where he met one or two of his old classmates and was honored by being made honorary marshall of the alumni parade. It was amusing and perhaps regrettable that his scale of values placed personal appearance in the category of non-essentials. His face was so interesting, his eyes so keen and sparkling, and his conversation so entertaining and instructive, that his friends always made allowances for the rest. He seemed oblivious to any possible annoyance caused by his carelessness.

During his last eleven years a comfortable income enabled him to take many trips all over the western states and to publish his own Con-

tributions in which he said whatever he liked. Several times he accompanied to Little Zion and Bryce Canyons the ecological summer classes of his brother, Dr. Lynds Jones of Oberlin College. And finally, when about 80 years old, he made several difficult trips into Lower California.

With characteristic improvidence he spent much more on his old Ford than a new one would have cost, and was constantly being held up for days for repairs and having to be towed back from reckless attempts to defy floods, impassable roads and bad weather. But he enjoyed it all and continued to the end an undaunted camper and explorer, an indefatigable worker and investigator. His memory was prodigious and his versatility amazing.

In criticism of other scientists he was usually sharp and caustic, although he did not himself take criticism very well nor tolerate difference of opinion. But to the amateur botanists, especially those who worshipped at the shrine of his truly vast fund of knowledge and experience, he was gentle and kind, generous, patient, and always helpful. He had made a very thorough study of the geologic history of the West, and probably no living botanist had nearly so great ecological knowledge as he.

Until nearly 70 years of age Prof. Jones was a fundamentalist in religion, always active in church life, teaching classes, superintending mission Sunday-schools, and for years acting as supply preacher in various non-Mormon churches in Utah. But in his later years deafness made him cease attending church, disappointment with the unworthy character of several ministers led him to distrust their leadership, and a thorough overhauling of his old theological beliefs in the light of his scientific knowledge led him to discard most of them and to repudiate the church as an institution which had strayed from the purpose and spirit of Christ; but he always retained his faith in God and his implicit belief in prayer.

It is doubtful whether Prof. Jones could have completed the revision and publication of his Flora of the Great Plateau if he had lived. Leisure and relief from financial handicap came too late for him to be able to stand the grilling strain of the work. And it is also doubtful whether there is any other living botanist familiar enough with the territory covered to complete it. It would probably require at least five years of the time of a qualified botanist, to say nothing of the expense. Much of the Great West which the manuscript and specimens represent is built up into cities now and gone forever as a botanist's paradise. But Dr. P. A. Munz is taking excellent care of this priceless store of source material at Pomona College in Claremont, California, where it is available for research. — M. J. B.

EPITAPH UNIVERSAL
FOR BABE OR PATRIARCH
"STRICKEN DOWN ERE ITS WORK WAS DONE"

Out of the dusk and out of the dawn,
Ever and ever the rune runs on.
Early or late be the task begun,
None survives till his work is done.

Epitaph of humanity,
Whispered and carved while the race shall be,
Blazoned on fire by the last low sun:
Stricken down ere its work was done.

EOLUS.